

June 7, 2011

Project No. 04-01-101-001

Mr. William Knight, P.E.
Supervisor
Special Projects Branch
Bureau of Corrective Actions
Nevada Division of Environmental Protection
2030 East Flamingo Road, Suite 230
Las Vegas, Nevada 89119


Re: Titanium Metals Corporation
Henderson, Nevada Facility
NDEP Facility ID # 000537
Semiannual Groundwater Monitoring Report – 2nd Semester, 2010
Response to NDEP's April 22, 2011 Comments

Dear Mr. Knight:

Please find attached a copy of Titanium's Metals Corporation's (TIMET's) response to NDEP's comments dated April 22, 2011 regarding the Semiannual Groundwater Monitoring Report for the 2nd Semester of 2010. The attached report has been response has been authored by Ms. Victoria Tyson-Bloyd of Tyson Contracting and Ms. Candace Friday of CdFriday & Associates. This document has been reviewed and approved by Craig Wilkinson of TIMET and me.

If you have any questions regarding this submittal, please do not hesitate to contact me at (702) 563-0600.

Sincerely,
BROADBENT & ASSOCIATES, INC.



Kirk J. Stowers, EM-1549 (exp. 10/11/12)
Associate Geologist

JURAT: I, Kirk J. Stowers, hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances.

cc: Craig Wilkinson – TIMET, hard copy and by electronic mail
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Joe Kelly – Montrose, by electronic mail
Paul Sundberg – representing Montrose, by electronic mail
Lynne Preslo – representing Montrose, by electronic mail
Brian Waggle – representing Montrose, by electronic mail
Curt Richards – Olin, by electronic mail
Lee Erickson – Stauffer, by electronic mail
Nick Pogoncheff – representing Stauffer, by electronic mail
George Crouse – representing Syngenta, by electronic mail
Matt Pique – Tronox, by electronic mail
Susan Crowley – representing Tronox, by electronic mail
Keith Bailey – representing Tronox, by electronic mail
Deni Chambers – representing Tronox, by electronic mail
Allan DeLorme – ENVIRON International Corp, by electronic mail
Mark Travers - ENVIRON International Corp, by electronic mail
Jeff Gibson – AMPAC, by electronic mail

Attachment A

Main Body

1. Table 2-1, for those wells that were pumped dry, please advise if TIMET has considered adjusting the pumping rate for these wells.

TIMET Response: Please note TIMET utilizes low-flow purging methods for all wells. The well that “ran dry” for this reporting event was well J2D3-R, which was pumped at 80 mL/min for 19 minutes.

2. Section 3.0, general comment, TIMET has sampled downgradient wells, however, the Deliverable provides no discussion on these wells or this sampling. This limits the usefulness of TIMET’s sampling effort and this Deliverable. It is requested that future Deliverables also discuss the downgradient data if it is available.

TIMET Response: Please note the TIMET initiated sampling of downgradient wells as a precursor to the implementation of the groundwater remediation system at NDEP behest. NDEP requested TIMET expedite sampling of these wells to provide a “base-line.” Discussion of the data regarding these wells without referencing regional data (i.e. the BMI common area well network) would not be meaningful and is outside the scope of TIMET’s current groundwater monitoring program. Monitoring of these well locations and the selection of the constituent list for which they were sampled was made with NDEP input for the specific data need of groundwater remedy performance at the TIMET Plant Site. Assessment of data from the downgradient wells will included as part of the system performance evaluation once the system is installed and operating.

3. Section 3.0, page 3-1, last paragraph, TIMET proposes to present data for only the even quarters on Figures and Tables. NDEP notes that this makes evaluation of historical ranges and trends very difficult and requests that TIMET not make this change.

TIMET Response: Please note that in 2009 only two quarters were sampled and reported on the Section 3.0 tables. The column headers should read “1st Semester” and “2nd Semester” for 2009 in same manner as 2010. Future reports will make this change for clarity.

4. Section 3.2.1.1, pages 3-5 and 3-6 and Table 3-46, NDEP provides the following comments:

- a. Section 3.2.1.1, Cation-Anion Balance (CAB) and TDS Ratio, TIMET states that CAB evaluations were not performed for select groundwater samples due to the rejection of one or more analytes. Please discuss specific analyte rejections in detail, and include a description of quality assurance measures that will be implemented in the future to avoid this issue.

TIMET Response: In Section 2.1.8 subsection “Other Stable Chemistry Qualification” addresses the suspected switching of results between groundwater wells PC-028 and PC-067. This was an isolated event and since it could not be determined whether the switch was in the field or in the laboratory, TIMET took the most conservative approach and rejected both sets of metals data. Since this was not a recurring issue, no formal root cause analysis or corrective action was necessary.

- b. Table 3-46, the tabulated CAB percent difference, TDS ratio and EC ratio values do not appear to follow the referenced NDEP guidance for use of significant figures. Please review and follow the guidance for future Deliverables.

TIMET Response: All calculations were made according to the significant figures rule as provided in the NDEP guidance. When the final table was generated from Excel, values such as 1.0, 7.0, 3.0, etc were transferred to the PDF as a whole number with only one significant figure. As such, it appears that the significant figures reported for some of these values are incorrect; however, it was a printing error. The significant “0” has been added where appropriate. See revised Table 3-21.

- c. Table 3-46, the TDS Ratio for the groundwater sample collected from well AA-09 is tabulated as 1. NDEP calculates this value (using values from the live executable spreadsheet, and rounded to 2 significant figures) to be 0.97 for this sample, and finds that this sample should be qualified as J-TDS. Please verify calculations, and correct tables and text where appropriate.

TIMET Response: The TDS results has been qualified as estimated “J” and assigned the comment code “p” in the TIMET EDD. See revised Table 3-21 and the EDD. Also see revised Table 15 in the DVSR for this event.

5. Section 3.2.2, page 3-7, uranium, Figure D-12 does not appear to support TIMET's assertion that uranium concentrations on the TIMET site are being influenced by properties to the west. Please provide the relevant supporting documentation or do not include unsupported statements such as this in future Deliverables.

TIMET Response: As NDEP is aware, TIMET has provided a groundwater map with Tronox data included which supported this statement during a single comprehensive monitoring event conducted by Tronox (as part of their source area investigation). TIMET is unable to provide periodic semi-annual data coincident with TIMET sampling events for this constituent from the Tronox/Trust facility since it has not been added to the Tronox/Trust routine groundwater monitoring regimen.

6. Section 3.2.2, page 3-7, vanadium, please provide an isoconcentration plume map to NDEP. This can be provided via electronic mail.

TIMET Response: Please see attached.

7. Section 3.2.4, page 3-8, regarding TCE, it should also be noted that the concentrations at well MW-3R may represent historical highs per Figure C-37 and Table 3-15. Please clarify.

TIMET Response: This well was installed in 2009 and has been monitored for four events with the following TCE values reported: 19, 22, 19, and 23 ug/L. TIMET agrees that 23 ug/L is the highest value reported but would not classify this value as a "historical high" without additional monitoring data. TIMET will continue to monitor this well and report the concentration trends.

8. Tables 3-2 through 3-46, NDEP notes that these tables can be provided in electronic format only in future Deliverables.

TIMET Response: The next report will make this change.

9. Appendix C, NDEP provides the following comments that should be discussed in the Deliverable. These examples should be used to determine if there are additional issues:
- Figure C-3, it appears that well AA-11 is at a historically high concentration.
 - Figure C-6, it appears that wells POU-3 and PC-067 are historically high concentrations.

- c. Figure C-10, it appears that well PC-067 is a historically high concentration.
- d. Figure C-14, well DBMW-3 has had a dramatic decrease in concentration.
- e. Figure C-24, it appears that wells AA-UW-1 and AA-01 are historically high concentrations.
- f. Figure C-29, it appears that well TMMW-104 is a historically high concentration.
- g. Figure C-32, it appears that wells POU-3, PC-124 and PC-024 are historically high concentrations.
- h. Figure C-40, it appears that well PC-067 is a historically high concentration.

TIMET Response: The trend graphs only report data that TIMET has collected for these off-site wells at NDEP's behest. Please note these wells have repeatedly been sampled by BRC as part of the BMI Common Area well network. Discussion of historical trends without consideration of this additional data would not be valid. As TIMET noted previously, discussion of the off-site downgradient data in this context is outside the scope of TIMET's current groundwater monitoring program.

Specific Additional Comment Regarding 9(f): For monitoring well TMMW-104, TIMET agrees that total trihalomethanes reported a ten-fold increase in concentration from 2009 concentrations to the 1st Semester 2010 concentration of 10.55 ug/L. This was due to the increase in chloroform (the main contributor of TTHMs at the Complex) from less than 1 ug/L in 2009 to 9 ug/L in early 2010. The upgradient (Lake Mead) wells are scheduled to be sampled during the 1st semester 2011 event and concentrations of TTHMs will be added to the discussion in the text of the next report.

Data Validation Report

General Comment: The following comment appears to be recurring in the DVSRs provided over the years for several wells: *In several SDGs from this event, the pH of samples received for cyanide and sulfide aliquots were lower than the required pH of 12 and 9, respectively. It appears that the groundwater itself has a buffering capacity that limits the ability to chemically preserve the sample to a pH of 12 using the amount of preservative provided in the sample container.* Please verify with the laboratory if this issue can be prevented by adding additional base to those samples in the field, using historical data as a guide. Also, please verify when the cyanide matrix spike samples are adjusted to the correct pH; prior or after spiking. Please advise as to whether or not buffering effects the poor matrix spike recovery of cyanide in some of the samples.

TIMET Response: This issue has been discussed and addressed in previous years with the assistance of the laboratory. The laboratory standard operating procedure is to add 1.5 mL of 20% NaOH to a 500-mL bottle. For TIMET they already add as much as 2 or more mLs and the pH is still buffered down.

The laboratory confirmed that pH adjustment is made upon receipt; which would be prior to spiking. The laboratory notes that often by the time the sample is ready for preparation, the pH has lowered again. This confirms the large buffering capacity of the sample itself and may address the issue of poor spike recovery.

TIMET addressed the cyanide spiking issue also in previous years. The laboratory confirmed again that the poor spike recoveries are not systemic within the laboratory, as most other groundwater sample recoveries are acceptable, but agrees that the issue is unique with TIMET groundwater samples and is directly related to the overall water chemistry.

1. Sample Filtering, please indicate whether or not samples were filtered before analysis and/or sample prep.

TIMET Response: Groundwater samples were not filtered at any time prior to preparation for analysis. The results represent “total” analyses.

2. Blank Contamination, Table 7, the NDEP offers the following comments:
 - a. The Table shows data that were qualified as undetected or estimated and biased low based on laboratory blank contamination. However, the type of blank(s) (method or calibration) and its contamination level is not shown in the table. Without knowing the level of blank contamination for the qualified sample, the reviewer cannot verify the reasoning for designating U or J to the sample. This information should be in Table 7 or the text.
 - b. For SDG 1010422/Sample ID J2D4 and SDG 1010445/Sample ID J2U2, the letters LTTI are listed next to the reported results. LTTI should be defined in the table caption. Additionally, the definition for comment “o” should be added as a Note to the table.

TIMET Response (a): Qualification is based on a combination of laboratory blanks (method and calibration) for metals. For volatile organic compounds, wet chemistries, and radiochemistries, qualification is based on laboratory method blanks only.

For stable chemistries, the decision to qualify results as undetected (U) or estimated and biased low (J-) based on blank contamination is clearly defined in Section 2.1.3.3. It is not based on the empirical value of the associated blank but on the value's relationship to the PQL as shown in the table within Section 2.1.3.3. For radionuclides, the decision is discussed in the text of Section 2.1.3.3.

Presenting individual blank results from which qualifications were made would be a very time consuming task, as the laboratory calibration blanks for metals are not provided in an electronic format (other than pdf). For this DVSR submittal, all blank values except radionuclides were less than the PQL or negative in value. Note that if any of the blank values for metals, wet chemistries, or VOCs were above the PQL, then those values would be identified and the appropriate qualification would be discussed in more detail in the text of the DVSR. At this time, TIMET will defer creating a table of blank values to its next submittal provided that the laboratory can include this information electronically.

TIMET Response (b): The definitions of "LT", "TP", and "o" were added to the footnotes for Table 7 as recommended. See revised Table 7.

3. Spike Recovery, Table 8, the NDEP offers the following comments:
- Table 8 indicates that the spike recovery (J2D2-RS MS Gross alpha) was exceeded for SDG 1010201/Sample IDs CLD1-R and CLD4-R and SDG 1010223/Sample ID J2D2-R2. The spike recovery was met based on the value of 60.5%, which is within the QC limits of 25-125 %R. However, it appears these were qualified due to not meeting the "requested minimum detectable activity." The requested MDA values should then be listed and these qualifiers would better fit either in a separate table or in Table 11.
 - The text in Section 2.1.4, page 11, paragraph 2 of the DVSR states "Data that were qualified based on MS/MSD and/or LCS/LCSD recoveries that were outside the QC limits are presented in Table 9." Instead of Table 9, it should be Table 8.

TIMET Response (a): The listed sample results remain qualified as listed in Table 8, as the QC limits were actually 75 to 125 percent and not 25 to 125 as originally reported. See revised Table 8.

TIMET Response (b): The text in Section 2.1.4 has been revised to refer to Table 8 as recommended. See revised DVSR text.

4. Results Below PQL, Table 11, the NDEP offers the following comments:
- Many of the results in Table 7, with the B qualifier are not also found in Table 11. Vanadium in sample 1010201-6 with a result of 30 is an example.
 - The code E is listed next to the results for SDG 1010263/Sample ID PC-028 (chloroform), should be defined in the report text and the table Notes.

TIMET Response (a): The comment code “g” was omitted from 74 records. The EDD and Tables 7 and 11 have been revised to include the additional comment code. See revised EDD and Table 7 and 11.

TIMET Response (b): The referenced chloroform value should have been coded with a “j” instead of a “g”, since the value was reported greater than the calibration range of the instrument. As such, the result was removed from Table 11 and added to Table 12. The correction is also made in the EDD. See revised EDD, Tables 11 and 12, and the text for Section 2.1.8.

5. SDGs, the EDD provided with this DVSR does not include SDG 1010063, yet the laboratory data for this SDG was provided. However the EDD does include SDG 1010471. The laboratory data for SDG 1010471 is not included in the DVSR package. Please make necessary corrections.

TIMET Response: The text and tables of the DVSR and the NDEP EDD do not include SDG 1010063, but do include SDG 1010471, as intended. SDG 1010063 was never intended to be reported at this time, since these samples were not part of the routine groundwater reporting. The laboratory data package for SDG 1010063, was unintentionally included in Appendix B of the DVSR and should be disregarded at this time for this reporting event. The laboratory data package for SDGB 1010471 was originally included in Appendix B, as intended. No revisions are necessary.

6. Section 2.1.8, page 14, in the last paragraph, the first sentence starting “In addition, a possibility exists...” is incomplete.

TIMET Response: The referenced statement has been completed. See revised text in Section 2.1.8.

7. Section 2.1.8, page 15, the text in the subsection “Other qualification for radiochemistries” states that data for lead-212 and potassium-40 were qualified and should be in Table 13. There is no data on these two radionuclides. Please advise if the text is incorrect or if the data missing. Additionally, the text states

“no bias is assigned as this is a qualitative issue...”, but a +/- bias is indicated for the J2D4, J2U2 and TIMETMW-3R samples in this table. Please clarify.

TIMET Response: The text in Section 2.1.8 has been revised to match Table 13 by removing the references to lead-212 and potassium-40. The bias shown in Table 13 was the result of qualification due to blank contamination and inherent analytical bias and not based on tentative peak identification (TI flag). As such Table 13 is correct. See revised text in Section 2.1.8 (Other qualification for radiochemistries).

8. Section 2.2.2, page 18, in the second paragraph, the text states “Table 9 presents groundwater table data...” This should be Table 8 instead.

TIMET Response: The referenced text has been revised to reference Table 8 instead of Table 9. See revised text in Section 2.2.2.

9. Section 2.1.10, page 16, the EDD shows 141 results that have been rejected yet the DVSR indicates this number should be 146. Please correct this discrepancy.

TIMET Response: The EDD delivered to NDEP did not include results for two samples (DBMW-1, and DBMW-5). The correct number of rejected data points is 146 as stated in the DVSR text and listed in Table 16. See revised EDD.

EDD (updated April 18, 2011)

1. Percent_moisture field should be in Results Table not Samples Table. This allows for cases where different moisture values were measured with different analytical suites.

TIMET Response: The percent_moisture field has been removed from the Samples Table and included in Results Table. See revised EDD.

2. Please add the litho information for sample J2D3 or advise why it is not available.

TIMET Response: Litho information for J2D3 has been added. See revised EDD.

3. The analysis time is Null for 49 pH measurements and the analysis date is NULL for 13 of these. Confirm if the pH values were measured during the time of collection. Please note that this can be added to the DVSR if including this information in the EDD is not available automatically.

TIMET Response: The analysis dates and times for pH have been entered based upon time of collection. See revised EDD.

4. Check the use of the detect_flag_fod:
 - a. There are 2350 records in Results Table where detect_flag_fod is true but final_validation_qualifier is non-detect. This is inconsistent with the guidance.
 - b. There are 87 records in Results Table that need a final_validation_reason_code because the detect_flag_fod is T (true) and results_reported <= SQL. It is also noted all of these records have the PQL = SQL. These all appear to be original non-detects (based upon the lab qualifier). If so, these do not require a reason code but it is unclear why the PQL would be equal to the SQL.
 - c. There are 66 records in Results Table where detect_flag_fod is false but final_validation_qualifier is not a non-detect. This is inconsistent with the guidance.
 - d. There are 188 records in Results Table that need a final_validation_reason_code because detect_flag_fod is F (false) and result_reported > SQL.
 - e. There are 214 records in Results Table where detect_flag_fod='F' and >result_reported > SQL.

TIMET Response: The criteria for determining_flag_fod has been corrected to address the noted discrepancies. See revised EDD.

5. The minimum detectable activity is not reported for any of the radionuclides. In all cases a SQL is provided but the MDA is the indicator needed for radionuclides.

TIMET Response: The export script to generate the NDEP EDD has been correct to provide the MDA for radionuclides. See revised EDD.

6. There are 2401 records in Results Table where final_validation_reason_codes is NULL and final_validation_qualifier not NULL. The guidance requires a reason code for all qualifiers. Many of these have a result value equal to the PQL with a U final qualifier. Unless these are censored at the PQL due to blank contamination, the reported value should likely be the SQL (non-detect at SQL).

TIMET Response: The reference results were qualified a “U” by the laboratory. We have added a reason code “s” to indicate results that were qualified as U by the lab. See revised EDD.

TABLE 3-21
CATION-ANION BALANCE EVALUATION
GROUNDWATER MONITORING REPORT SECOND SEMESTER 2010
Titanium Metals Corporation, Henderson, Nevada

Well ID	Cation Sum (meq/L) ¹	Anion Sum (meq/L) ²	Difference (%) ³	CAB Results	TDS Measured (mg/L)	TDS Calculated (mg/L)	TDS Ratio ⁴	TDS Results ⁵	TDS Measured (mg/L)	EC Measured (uS/cm)	EC Ratio TDS:EC ⁶	EC Results ⁷	Qualifier
AA-01	58	62	3.2	Acceptable	4200	3700	1.1	Acceptable	4200	5110	0.82	Acceptable	No qualifier
AA-09	81	88	4.3	Acceptable	5200	5300	0.97	Unacceptable	5200	7210	0.72	Acceptable	J-TDS
AA-11	66	72	4.2	Acceptable	4500	4300	1.0	Acceptable	4500	5780	0.78	Acceptable	No qualifier
AA-20	84	90	3.6	Acceptable	5500	5400	1.0	Acceptable	5500	7150	0.77	Acceptable	No qualifier
AA-27	61	66	3.5	Acceptable	4300	4000	1.1	Acceptable	4300	4880	0.88	Acceptable	No qualifier
AA-UW1	57	62	3.5	Acceptable	3900	3800	1.0	Acceptable	3900	4430	0.88	Acceptable	No qualifier
BRW-R1	50	57	6.4	Unacceptable	3700	3500	1.1	Acceptable	3700	4600	0.80	Acceptable	J-CAB
CLD1-R	56	64	7.0	Unacceptable	3800	3600	1.1	Acceptable	3800	6180	0.61	Acceptable	J-CAB
CLD4-R	82	99	9.4	Unacceptable	5700	5700	1.0	Acceptable	5700	9980	0.57	Acceptable	J-CAB
CMT-101	NA	NA	NA	NA	6100	NA	NA	NA	6100	9190	0.66	NA	NA
DBMW-1	83	92	5.1	Unacceptable	5800	5500	1.1	Acceptable	5800	7120	0.81	Acceptable	J-CAB
DBMW-3	120	140	5.2	Unacceptable	8300	8100	1.0	Acceptable	8300	11000	0.75	Acceptable	J-CAB
DBMW-4	78	85	4.8	Acceptable	5600	5100	1.1	Acceptable	5600	6260	0.89	Acceptable	No qualifier
DBMW-5	74	83	5.5	Unacceptable	5200	4900	1.1	Acceptable	5200	6000	0.87	Acceptable	J-CAB
J2D1-R2	95	97	1.0	Acceptable	6000	5500	1.1	Acceptable	6000	8990	0.67	Acceptable	No qualifier
J2D2-R2	74	85	6.7	Unacceptable	5300	4700	1.1	Acceptable	5300	7110	0.75	Acceptable	J-CAB
J2D3	72	NA	NA	NA	NA	NA	NA	NA	NA	6440	NA	NA	NA
J2D4	160	170	3.7	Acceptable	9800	9500	1.0	Acceptable	9800	15500	0.63	Acceptable	No qualifier
J2U2	73	77	2.7	Acceptable	4700	4400	1.1	Acceptable	4700	6460	0.73	Acceptable	No qualifier
M-129	NA	NA	NA	NA	5500	NA	NA	NA	5500	7540	0.73	NA	NA
M-130	NA	NA	NA	NA	5600	NA	NA	NA	5600	7210	0.78	NA	NA
PC-024	150	160	4.4	Acceptable	9800	9200	1.1	Acceptable	9800	14600	0.67	Acceptable	No qualifier
PC-028	NA	85	NA	NA	5600	NA	NA	NA	5600	7950	0.70	NA	NA
PC-054	76	75	0.17	Acceptable	5900	4800	1.2	Acceptable	5900	6560	0.90	Acceptable	No qualifier
PC-067	NA	180	NA	NA	5600	NA	NA	NA	5600	16500	0.34	NA	NA
PC-124	110	130	4.8	Acceptable	7100	7100	1.0	Acceptable	7100	10400	0.68	Acceptable	No qualifier
POU-3	140	160	5.9	Unacceptable	9000	8900	1.0	Acceptable	9000	14300	0.63	Acceptable	J-CAB
TIME-TMW-3R	26	30	6.7	Unacceptable	2000	1800	1.1	Acceptable	2000	2870	0.70	Acceptable	J-CAB
TIME-TMW-4	43	48	5.2	Unacceptable	3000	2900	1.0	Acceptable	3000	3740	0.80	Acceptable	J-CAB
TIME-TMW-5	56	66	8.6	Unacceptable	3900	3800	1.0	Acceptable	3900	5450	0.72	Acceptable	J-CAB
TIME-TMW-6R	46	52	6.7	Unacceptable	3100	2900	1.1	Acceptable	3100	4920	0.63	Acceptable	J-CAB
TMPZ-105	NA	NA	NA	NA	6900	NA	NA	NA	6900	10540	0.65	NA	NA
TMPZ-106	NA	NA	NA	NA	7600	NA	NA	NA	7600	12340	0.62	NA	NA
TMPZ-107	NA	NA	NA	NA	15000	NA	NA	NA	15000	22800	0.66	NA	NA
TMPZ-108	NA	NA	NA	NA	16000	NA	NA	NA	16000	22700	0.70	NA	NA
TMPZ-109	NA	NA	NA	NA	5600	NA	NA	NA	5600	7460	0.75	NA	NA
TMPZ-110	NA	NA	NA	NA	4900	NA	NA	NA	4900	6080	0.81	NA	NA

TABLE 3-21
CATION-ANION BALANCE EVALUATION
GROUNDWATER MONITORING REPORT SECOND SEMESTER 2010
Titanium Metals Corporation, Henderson, Nevada

Notes:

CAB	Cation/anion balance	mg/L	Milligram per liter
EC	Electrical conductivity	TDS	Total dissolved solids
meq/L	Milliequivalent per liter	uS/cm	MicroSiemens per centimeter

- 1 Cations summed include: Calcium, magnesium, sodium, and potassium.
- 2 Anions summed include: Bicarbonate, carbonate, chloride, fluoride, nitrate-nitrogen, perchlorate, and sulfate.
- 3 QC criterion for CAB: absolute percent difference less than or equal to 5 percent; when the anion sum is between 10 and 800 meq/L.
- 4 Ratio of laboratory measured TDS to calculated TDS.
- 5 QC criterion for TDS measured versus calculated: ratio of TDS measured to TDS calculated greater than or equal to 1.0 and less than or equal to 1.2.
- 6 QC limits for TDS versus ED ratio is 0.54 to 0.96
- 7 J-TDS indicates that TDS value for the given well is estimated; J-CAB indicates that the values for the 11 cation/anions are estimated for a given well.
The qualification of results based CAB includes the "J" qualifier with the associated comment code "p" or "q" in the TIMET analytical database



BRW-R1 13	MONITORING WELL WITH VANADIUM CONCENTRATION (µg/L)	µg/L	MICROGRAM PER LITER

WELL NOT ANALYZED

100
VANADIUM CONTOUR (μg/L)

APPROXIMATE CONTOUR LOCATION

TIMET PROPERTY BOUNDARY

Note:
The screening level used for vanadium is the NDEP BCL for residential water of 182.5 ug/L.

**FIGURE X-X
VANADIUM
ISOCONCENTRATION MAP
2ND SEMESTER 2010**



Titanium Metals Corporation
Henderson, Nevada

2nd SEMESTER, 2010
DATA VALIDATION SUMMARY REPORT
FOR
SEMIANNUAL REPORTING OF
GROUNDWATER MONITORING DATA

Titanium Metals Corporation
Henderson, Nevada

Submitted to
Nevada Division of Environmental Protection
2030 E. Flamingo Road, Suite 230
Las Vegas, Nevada 89119-0818

March 31, 2010

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Appendix

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ACRONYMS AND ABBREVIATIONS

pCi/L	PicoCurie per liter
ASTM	American Society for Testing and Materials
CAB	Cation/anion balance
CCB	Continuing calibration blank
CFR	Code of federal regulations
COC	Chain of custody
CVAA	Cold vapor atomic absorption
DER	Duplicate error ratio
DQO	Data quality objective
DOE	U.S. Department of Energy
DVSR	Data validation summary report
EDD	Electronic data deliverable
EPA	U.S. Environmental Protection Agency
GC/MS	Gas chromatography/mass spectrometer
HASL	Health and Safety Laboratory
ICB	Initial calibration blank
ICP	Inductively coupled plasma
ICP/MS	Inductively coupled plasma/mass spectrometer
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
LSC	Liquid scintillation counter
MD	Matrix duplicate
MDA	Maximum detectable activity
MDL	Method detection limit
MS	Matrix spike
MSD	Matrix spike duplicate
NDEP	Nevada Division of Environmental Protection
PARAGON	ALS-Paragon Analytics, Inc.
PARCCS	Precision, accuracy, representativeness, completeness, comparability, and sensitivity
PQL	Practical quantitation limit

ACRONYMS AND ABBREVIATIONS (Continued)

QA	Quality assurance
QC	Quality control
RPD	Relative percent difference
SAP	Sampling and analysis plan
SDG	Sample delivery group
SQL	Sample quantitation limit
STL	Severn Trent Laboratories, Inc.
TDS	Total dissolved solid
TIC	Tentatively identified compound
TIMET	Titanium Metals Corporation, Inc.
VOC	Volatile organic compound

1.0 INTRODUCTION

This data validation summary report (DVSR) was prepared to assess the validity (based on data validation) and usability (based on project objectives) of groundwater analytical data collected during the second semester sampling event in 2010 at the Titanium Metals Corporation, Inc. (TIMET) facility in Henderson, Nevada. The routine groundwater monitoring program is established in the current Groundwater Monitoring Program Sampling and Analysis Plan (SAP), dated October 29, 2007 (TIMET 2007a). During this event, the following types of data collection events were conducted:

- Routine sampling of six groundwater protection and landfill permit wells (CLD1-R, CMT-101 (replaces CLD3-R), CLD4-R, J2U2, J2D4, and MW-6R).
- Semi-annual sampling of 14 Plant Site wells (BRW-R1, J2U1, J2U2, J2D1-R2, J2D2-R2, J2D3-R, J2D4, CLD1-R, CLD2-R, CLD4-R, MW-3R, MW-4, MW-5, and MW-6R).
- Groundwater collection at up-gradient wells (TMMW-101, TMMW-102, TMMW-103, and TMMW-104).
- Groundwater collection at off-site down-gradient wells and piezometers near the property line to the north (see Table 1 for the remaining well locations sampled).

It should be noted, however, that several wells were not sampled as listed above. Wells J2U1, AA-19, and POD2-R did not produce sufficient groundwater volume for sample collection during the semi-annual event; as such, no data were collected for these locations.

Table 1 lists all samples collected at the well locations during each of the events in this reporting period. A sample is defined as all fractions of a matrix (groundwater) from a given location (monitor well) during a single event (quarter).

1.1 PURPOSE AND OBJECTIVES

The purpose of this DVSR is to summarize the validation and usability for chemical groundwater data collected during this event. Routine monitoring is conducted according to the current Groundwater Monitoring Program Sampling and Analysis Plan (SAP), dated October 29, 2007 (TIMET 2007a). The purpose of the groundwater investigation is to:

- Characterize the distribution of inorganic, organic, and radiochemical analytes in groundwater.
- Characterize the hydraulic characteristics of the aquifer more completely.

- Evaluate relationships between groundwater chemistry, hydrogeology, and potential sources.

Compliance monitoring requirements for evaporation ponds HP-1 and HP-6 consist of the following:

- Field measurements of groundwater levels and pH at monitoring wells CLD1-R, CMT-101, CLD4-R, J2U2, J2D4, and MW-6R.
- Collection of samples for laboratory analysis of nitrate as nitrogen, total nitrogen, chromium, chloride, and total dissolved solids (TDS) at the same locations as above.

The groundwater monitoring requirements for the J-2 Landfill consist of the following:

- Field measurements of groundwater levels, pH, and specific conductivity at monitoring wells J2U2, J2D1-R2, and J2D2-R2.
- Collection of samples for laboratory analysis of TDS, total chromium, magnesium, chloride, and vanadium at the same locations as above.

The groundwater monitoring program also includes the following activities conducted on a semi-annual basis:

- Measure groundwater levels in all wells in the program.
- Collect groundwater samples for field and chemical analysis.
- Evaluate groundwater hydraulic and water quality data.
- Analyze groundwater data for trends and compare to appropriate screening levels.

All analyses for groundwater samples collected during this reporting period were conducted by ALS-Paragon Analytics, Inc. (Paragon) of Fort Collins, Colorado. All data were delivered as hardcopy data packages and accompanied by electronic data deliverables (EDD). Hardcopy data deliverables included full data packages (including sample results, quality control [QC] summaries, and all associated sample receipt, preparation, and analytical raw data). EDDs received from the laboratory were loaded into a Microsoft Access® database and used for reporting. The laboratories reported the sample results in the EDDs, along with applicable laboratory qualifiers. In addition to sample results, associated field and laboratory QC sample results were reported in the EDDs.

The following types of analyses were conducted on groundwater samples collected during this reporting period and analyzed by Paragon:

- Volatile Organic Compounds (VOC) by gas chromatography/mass spectrometry (GC/MS) by U.S. Environmental Protection Agency (EPA) Method 8260B and revisions ([EPA 2007](#)).

- Total metals by inductively coupled plasma (ICP) by EPA Method 6010B, ICP/mass spectrometer (ICP/MS) by EPA Method 6020, and cold vapor atomic absorption (CVAA) for mercury by EPA Methods 7470 (EPA 2007).
- Inorganic analytes including alkalinity by titration (EPA Method 310.1), cations by ICP (included in total metals listed above), anions by ion chromatography (EPA Method 300.0), perchlorate by ion chromatography (EPA Method 314.1), and hexavalent chromium by colorimetry (EPA Method 7196A) (EPA 1983 and 2007).
- Physical parameters including total dissolved solids (TDS) and total suspended solids (TSS) by gravimetric determination (EPA Methods 160.1 and 160.2, respectively) (EPA 1983).
- Radionuclides, including alpha (total) and gross beta (EPA Methods 9310 and 900.0), gamma emitters (EPA Method 901.1), radon-222 (American Society for Testing and Materials [ASTM] D5072-92), isotopic radium (EPA Methods 903.1/904.0), isotopic thorium and uranium (ASTM Method D3972-90), and lead-210 by liquid scintillation counter (LSC) technique according to an in-house standard operating procedure (ASTM 1990, ASTM 1992, EPA 1980, EPA 2007, and Paragon 2004). Paragon also references the U.S. Department of Energy (DOE) Health and Safety Laboratory (HASL) Procedures Manual (HASL-300) (DOE 1997a).

Quantitation limits are critical to the proper evaluation of method sensitivity and non-detect data. Three types of quantitation limits were evaluated for stable chemistries as follows:

- Method detection limit (MDL) – This limit was established by the laboratories according to the requirement in 40 CFR 136, Appendix B, and represents the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. MDLs are established using matrices with little or no interfering species using reagent matrices and are considered the lowest possible reporting limit. Often, the MDL is represented as the instrument detection limit. Because these limits do not reflect sample-specific characteristics and preparation volumes/masses, MDLs were not reported in the hardcopy or EDDs for individual samples. However, MDLs can be indirectly obtained from the limits reported for method blanks, as method blanks were reported to the MDL.
- Sample quantitation limit (SQL) – The SQL is defined as the MDL adjusted to reflect sample-specific actions, such as dilution or use of smaller aliquot sizes, and takes into account sample characteristics, sample preparation, and analytical adjustments. The SQL represents the sample-specific detection limit and all non-detected results are reported to this level.
- Practical quantitation limit (PQL) – This limit is defined as the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration point for the analyte, and includes the predicted effect of sample matrices with typical interfering species. The PQL is the lowest concentration of an analyte that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. PQLs are used to estimate or evaluate the minimum concentration at which the laboratory can be expected to reliably measure a specific chemical contaminant during day-to-day

analyses of different sample matrices. Detected results greater than the SQL, but less than the PQL were qualified by the laboratory as estimated. Further qualification based on this scenario is discussed in Section 2.1.8.

Laboratories consistently reported PQLs and SQLs for all stable chemistries in the EDDs, which were subsequently entered into the TIMET database.

For radionuclides, Paragon reported the minimum detectable activity (MDA) (also known as minimum detectable concentration) as the “reporting limit.” The MDA for radionuclides is the lowest level of activity in a given sample that is statistically distinguishable from a sample with no activity, at the 2-sigma confidence interval. The MDAs for radionuclide analysis are determined by a mathematical formula that takes into account sample volume, chemical recovery, instrument detection efficiency and background, and sample counting duration. The MDA, therefore, is equivalent to the SQL for radiochemical analytes. For radiochemical analysis, no PQL is established, as all results are reported to the MDA. In addition, the 2-sigma rad error is reported for each analyte in each sample.

QC data were reviewed in conjunction with sample data. Sample results were received in both hardcopy and electronic formats. The TIMET database includes both sampling information and analytical results. Table 1 presents all sample identification numbers and the analytical groups analyzed during this reporting period. Note that the limits reported by TIMET in the database are consistent with the recommendation by Nevada Division of Environmental Protection (NDEP) in the memo dated December 3, 2008 ([NDEP 2008](#)).

1.2 VALIDATION PROCESS

Two levels of validations were conducted on the analytical data collected during this investigation as required by the most current NDEP data validation guidance ([NDEP 2009a](#)):

- Level 2B – Including verification and validation based on completeness and compliance checks of sample receipt conditions and both sample-related and instrument-related QC results.
- Level 4 - Including verification and validation based on completeness and compliance checks of sample receipt conditions, both sample-related and instrument-related QC results, recalculation checks, and the review of actual instrument outputs.

According to NDEP guidance, at least 10 percent of all samples should undergo Level 4 validation; while the remaining 90 percent may be validated to Level 2B. Table 1 indicates the level of data validation conducted on the results from each sampling location; and shows that at least 10 percent of the

samples/analyses were validated to Level 4 criteria. According to the TIMET database (Appendix A), of the 3,700 validated sample results, 394 were validated at Level 4 exceeding the 10 percent criterion. Table 2 lists the review items associated with each of the two levels of validation. A description of each review item, including instances when results did not meet acceptance criteria, is provided in Section 2.0.

Stable chemistry sample results were validated in accordance with the following EPA guidance documents:

- “U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review” ([EPA 2008](#)).
- “U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review” ([EPA 2004](#)).
- “Region 9 Superfund Data Evaluation/Validation Guidance” ([EPA 2001](#)).
- NDEP data validation guidance and supplements ([NDEP 2009a](#), [2009b](#), and [2009c](#))

EPA has not standardized the validation of radionuclide data, so the reviewer relied on professional judgment and other sources to qualify the data. Radionuclide data validation was conducted using a DOE reference document, “Evaluation of Radiochemical Data Usability” ([DOE 1997b](#)) as well as QC requirements and criteria summarized in the applicable method. In addition, validation was conducted in accordance with the most current NDEP data validation guidance and supplements ([NDEP 2009a](#), [2009b](#), and [2009c](#)).

The project chemist conducted the data validation and review. Qualifications of the project chemist were submitted to NDEP as part of the project staff submittal ([Broadbent 2010](#)). Based on data validation and review, data qualifiers were placed in the electronic database to signify whether the data were acceptable, acceptable with qualification, or rejected. In addition, for every data validation qualifier, a secondary comment code was entered to indicate the primary reason for qualification. Table 3 provides the definitions for the data validation qualifiers and comment codes used in the database. Validation qualifiers and definitions are based on those used by EPA in the current validation guidelines ([EPA 2004 and 2008](#)). These comment codes include an indication as to the reason for qualification of data, as well as the expected bias, if applicable. The validated results are contained in the TIMET database and provided in electronic format as Appendix A to this document.

The laboratory was also required to submit a detailed case narrative with every data package listing any QC criteria that were not met or any other issue that might affect data quality (for example, initial or

continuing calibration problems). In addition to the criteria listed above, each laboratory case narrative was thoroughly reviewed. Results were qualified for any issues that affected data quality listed in the laboratory case narrative.

1.3 REPORT ORGANIZATION

After this introductory section, [Section 2.0](#) summarizes data validation and usability for groundwater data collected during this reporting period. [Section 3.0](#) provides general conclusions about the usability of the data sets. The conclusions regarding data usability will be used to prepare data quality objectives (DQO) for future environmental investigations undertaken at TIMET. The references and tables follow the conclusions and recommendations at the end of this document.

2.0 DATA VALIDATION SUMMARY

This section describes the data validation findings and usability with regard to the project-specific objectives. [Section 2.1](#) summarizes the data validation findings, and [Section 2.2](#) summarizes the evaluation of the following quality indicator parameters: precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS).

2.1 DATA VALIDATION FINDINGS

This section summarizes all items of the validation process and discusses how these findings affect data quality.

2.1.1 Sample Receipt and Holding Times

The condition of the samples upon receipt and holding times are evaluated initially by the laboratory, and then assessed by the reviewer. Minor issues related to the chains of custody (COC) involve the omission of trip blank IDs, collection dates, or collection times. These issues were immediately remedied with no affect on sample data quality.

Holding time refers to the period of time between sample collection and the preparation and/or analysis of the sample. Sample results were reviewed for compliance with the holding times set forth in Table 5 of the approved TIMET Site-Wide Generic SAP ([TIMET 2007b](#)).

The 24-hour holding time was missed on one hexavalent chromium result. As such, the result is qualified as estimated and biased low (UJ-/J-) and assigned the comment code “h” in the TIMET analytical

database. No results were rejected based on holding time. Table 4 lists the results qualified due to holding time exceedances.

The following sample receipt issues were observed during this reporting period; their resolution and affect on data quality are also discussed below:

- In several SDGs from this event, the pH of samples received for cyanide and sulfide aliquots were lower than the required pH of 12 and 9, respectively. It appears that the groundwater itself has a buffering capacity that limits the ability to chemically preserve the sample to a pH of 12 using the amount of preservative provided in the sample container.
- Almost all trip blanks and some of the groundwater sample VOC vials contained a small bubble upon receipt at the laboratory. Through investigation, it was determined that changes in air pressure during transportation of shipment cooler to and from the site (via airplane) resulted in vaporization of dissolved gases in the aqueous matrix. Since the bubbles were small (less than pea-size), no qualification of the sample results was necessary.
- The laboratory logged in samples TMPZ-107 and TMPZ-108 as “TMP2-107” and “TMP2-108,” respectively. The issue was addressed in the database. Data quality is not affected by this change.

The results affected by the pH issues described above were qualified as estimated and biased low (UJ-/J-) and assigned the comment code “h” in the TIMET database. Results qualified due to sample receipt conditions are presented in Table 5. No data were rejected on the basis of sample receipt condition alone; however, Table 5 shows that due to other QC issues with results, some results were ultimately qualified as rejected.

2.1.2 Calibration

Instrument calibration data were included in the laboratory hardcopy data packages, but not the EDDs (typical of the industry). Review included the instrument setup, operating conditions, initial calibration verifications, and continuing calibration verifications.

No metal, radionuclide, or general chemistry data were qualified based on calibration issues. However, for VOC analysis, the initial calibration relative response standards for acetone, acetonitrile, and ethanol were lower than the required limit. Table 6 lists all sample results qualified based on calibration issues during this reporting period. Nondetect results for acetonitrile and ethanol were qualified as rejected (R) because of the possibility of false negatives and assigned the comment code “c” in the TIMET analytical database. Rejected data points are not usable for meeting project objectives. Rejected data are further discussed in [Section 2.1.10](#).

2.1.3 Blank Samples

Field and laboratory blanks consisting of contaminant-free water were prepared and analyzed as part of standard quality assurance/quality control (QA/QC) procedures to monitor for potential contamination of field equipment, laboratory process reagents, and sample containers. For this program, two groups of blanks were prepared and analyzed: (1) laboratory blanks (calibration blanks and method blanks), and (2) field QC blanks (including trip blanks). Each blank type is discussed in the following sections (Sections 2.1.3.1 and 2.1.3.2). The assignment of validation qualifiers associated with blank contamination is discussed in [Section 2.1.3.3](#).

2.1.3.1 Laboratory Blanks

Two types of laboratory blanks were prepared and analyzed: calibration blanks and method blanks. Both types were prepared in the laboratory using high-grade, contaminant-free water.

Calibration Blanks – Calibration blanks are comprised of acidified high-grade contaminant-free water analyzed at the beginning (initial calibration blank [ICB]), end (continuing calibration blank [CCB]), and every 10 runs during analysis of metals by ICP, ICP/MS, and CVAA. Their primary function is to initially set the calibration curve (along with calibration standards) and continually monitor the background for possible variations in instrument electronic signal or cross-contamination. ICB and CCB data are included in the Paragon hardcopy data packages, but not the EDDs. As such, ICB and CCB data were evaluated based solely on hardcopy data (i.e., these results are not available in the database) for samples that underwent full validation only.

Method Blanks – Method blanks are laboratory QC samples that are prepared and analyzed with each batch of environmental samples. Method blanks are comprised of high-grade contaminant-free water that is carried through all preparation procedures in batches with field samples (including the addition of all reagents and QC monitoring compounds). Method blanks monitor potential contaminants in laboratory processes, reagents, and containers, and were analyzed for each analytical method used on field samples.

The following analytes were detected in one or more calibration or method blank (note that sample results may or may not have been qualified for all listed analytes based on the comparison of blank concentrations to sample concentrations; qualified data are discussed in [Section 2.1.3.3](#)):

- VOCs detected in method blanks – Methylene chloride.

- Metals detected in method blanks – Aluminum, barium, beryllium, boron, calcium, chromium, cobalt, copper, iron, lithium, magnesium, manganese, mercury, molybdenum, phosphorus, silicon, sodium, strontium, sulfur, thallium, tin, titanium, vanadium, zinc, and zirconium.
- Radionuclides detected in method blanks – Actinium-228, radium-228, and uranium-235.

2.1.3.2 *Field QC Blanks*

Trip and rinsate blanks were collected for this event. Trip blanks are field QC blanks collected and analyzed with field samples. Trip blanks were prepared at the laboratory by filling a 40-milliliter vial with high-grade, contaminant-free water and sealing it with a Teflon-lined lid. Trip blanks are shipped to the field sampling location accompanying sample containers in the shipping cooler. When samples for VOCs are collected and shipped back to the laboratory for analysis, a trip blank is transported within the shipping container. Trip blanks monitor for potential contamination of sample containers during shipment to the field, as well as monitor for potential contamination of VOC samples during collection and transportation back to the laboratory. A total of 24 trip blank samples were prepared by the laboratory and shipped to the field in coolers with unused sample containers; these samples were shipped back to the laboratory in coolers along with samples to be analyzed for VOCs. Trip blank data are reported in both the hardcopy and EDD formats (trip blank data can be obtained from the database). The following analytes were detected in one or more trip blanks (note that sample results may or may not have been qualified for all listed analytes based on the comparison of blank concentrations to sample concentrations; qualified data are discussed in [Section 2.1.3.3](#)):

- Methylene chloride and acetone

No results were qualified due to trip blank, because these compounds were either already non-detect or already qualified as undetected in associated samples.

2.1.3.3 *Qualifications Due to Blank Contamination*

The previous subsections describe the types of blanks that were collected and analyzed with field samples and lists analytes detected in the method blanks. This section discusses the procedure for evaluating blank results and applying qualifiers on field data.

Table 7 presents data that were qualified as undetected (U) or estimated and biased low (J-) based on laboratory blank contamination (including both calibration and method blanks). Note that not every

compound detected in laboratory blanks resulted in qualification of data. If the criteria listed below were not met for a given result, then no qualification was required.

All stable chemistry results were qualified as follows:

Blank Value	Sample Result	Qualification
Detects	Not detected	No qualification
< PQL	< PQL ≥ PQL	Report found value with U Use professional judgment (typically no qualification)
> PQL	< PQL ≥ PQL but < blank value ≥ PQL and > blank value	Report found value with U Report found value with U Use professional judgment (either J+ or no qualifier)
= PQL	< PQL ≥ PQL	Report found value with U Use professional judgment (either J+ or no qualifier)
Negative value (often seen with metals)	< PQL	Report sample value with J-
Gross contamination	Detects	Qualify as rejected "R"

For radionuclides, the qualification is simpler. Several radionuclides were detected above the MDA in laboratory blanks. However, no data were qualified or rejected due to blank contamination. Either results were significantly greater than the blank value, the results were already non-detect, or results were not reported from the associated analyses.

As listed in [Section 2.1.3.2](#), one VOC was detected in trip blanks associated with the SDGs in this DVSR. All associated sample results were either already non-detect, or already qualified as non-detect for other reasons. No data were qualified based on field blank contamination.

2.1.4 Spike Samples

Spiked samples are environmental matrices spiked with a subset of target compounds at known concentrations. These QC samples were analyzed with project samples to measure laboratory accuracy and potential interference from the matrix. Two types of spike samples were analyzed with the project samples to monitor for potential interferences during analysis:

- Matrix spike (MS) and matrix spike duplicate (MSD) samples; these samples consist of aliquots of environmental samples spiked with a subset of target compounds. MS/MSD samples monitor potential interference from the site-specific sample matrix and its effect on target compounds.

- Blank spike samples, also known as laboratory control samples (LCS); these samples are an aliquot of reagent soil or water spiked with a subset of target compounds. The LCS monitors laboratory accuracy without the bias of a sample matrix. In some cases, the LCS was analyzed in duplicate (LCSD).

At least one MS/MSD sample and one LCS were prepared and analyzed with each batch of environmental samples except for radionuclide and TDS analyses, which require only LCSs. Note that for some SDGs, the laboratory conducted MS and MSD analyses on samples that were not specific to the TIMET site. In those cases, evaluation of the MS and MSD is not conducted because the reviewer has no way to confirm that the matrix chosen is representative of samples from the TIMET facility.

The reviewer evaluated both the spike and duplicate recoveries of the MS and LCS pairs. Data were qualified only if both the MS and MSD recovery were outside the QC limits (or both the LCS and LCSD recoveries were outside the QC limits). If either recovery in the pair was acceptable, then data were not qualified. Data that were qualified based on MS/MSD and/or LCS/LCSD recoveries that were outside the QC limits are presented in Table 98. Analytical bias was also determined and qualified data were assigned bias codes (- or +) as necessary. Qualified results were also assigned the validation comment code “e” in the TIMET database. Note that in many SDGs the MS/MSD recoveries for cyanide were 0%. As such, cyanide sample results in these SDGs were qualified as rejected (R). Rejected results are discussed further in Section 2.1.10.

2.1.5 Surrogate Spikes and Carrier/Tracer Yields

Surrogate spikes were prepared by adding compounds similar to target compounds of interest to sample aliquots and associated QC samples for organic analyses only. Surrogate spike recoveries monitor the efficiency of contaminant extraction from the sample medium into the instrument measuring system and measure possible interferences from the sample matrix that may affect the data quality of target compound results. Similarly, tracer isotopes are added to radionuclide analyses to monitor the extraction and analysis of radionuclides.

Surrogate spikes were added to each of the samples submitted for organic analysis to monitor potential interferences from the matrix. Surrogates were added to the sample aliquot during preparation of the sample for analysis, and surrogate recoveries were compared with QC acceptance limits. Surrogate recoveries outside of the acceptable limits indicate interference from the sample matrix for the detection of target compounds. All surrogate recoveries were within acceptable limits, except for 1,2-dichloroethene-d4 in one sample. As such, positive results in the associated sample were qualified as

estimated (J) and assigned the comment code “a” in the TIMET database. No data were rejected based on surrogate recoveries. Results qualified based on surrogate recovery are presented in Table 9.

Both stable carriers and isotopic tracers were used to evaluate the efficiency of the preparation and analytical methods and to quantify the results. Carriers or tracers were added to each of the samples submitted for analysis of uranium, radium, thorium, and lead-210 isotopes. Carriers/tracers were added to the sample aliquot during preparation of the sample for analysis, and recoveries were compared with QC acceptance limits of 80 to 120 percent. Recoveries were within acceptable limits. No data were qualified or rejected based on carrier/tracer yields.

2.1.6 Internal Standards

Internal standards were prepared for certain VOCs and ICP/MS analyses by adding compounds similar to target compounds of interest to sample aliquots. Internal standards are used in the quantitation of target compounds in the sample or sample extract. Internal standard responses and retention times were presented in full data packages received from Paragon. The evaluation of internal standards involved comparing the instrument response and retention time from the target compounds in the sample with the response and retention time of specific internal standards added to the sample extract prior to analysis. All internal standard criteria were met; no data were qualified or rejected based on these criteria.

2.1.7 Duplicate Samples

Duplicate samples involved the preparation and analysis of an additional aliquot of a field sample. Results from duplicate sample analysis measure laboratory precision as well as homogeneity of contaminants in the field matrix. For this investigation, three types of duplicate analyses were conducted: (1) MSDs for organic analyses and total metals, (2) matrix duplicates (MD) for inorganic analyses (anions) and radionuclides, and (3) field duplicates for both types of analyses. MSDs and MDs measure laboratory precision and sample homogeneity, while field duplicates are used to evaluate field sampling technique precision, laboratory precision, and homogeneity of the sample matrix.

At least one duplicate analysis (MSD or MD) was performed with each batch of environmental samples processed in the laboratory. The laboratory calculated the relative percent difference (RPD) between the two detected values for MSD and MD analyses of stable chemistries. RPD values within the acceptable limits indicate both laboratory precision and minimal matrix heterogeneity of compounds detected in the samples. Results associated with elevated RPD values were qualified as estimated to indicate the variability in detected concentrations or poor laboratory precision. Duplicate precision that exceeded the

RPD criterion of less than or equal to 20 percent are listed in Table 10 and were qualified as estimated (J). Note that one TDS result was qualified as estimated based on duplicate precision, because the laboratory QC limit for TDS is 5 percent. In addition, the radon-222 qualifiers were based on replicate analyses of radon-222 that were greater than 20 percent. Qualified results were also assigned the validation comment code “d” in the TIMET database. No data were rejected based on laboratory duplicate results.

For radionuclides, the duplicate error ratio (DER) is calculated which takes into account the 2-sigma analytical error assigned to each radionuclide result. The DER equation is as follows:

$$DER = \frac{|S - D|}{2 * \sqrt{\sigma_s^2 + \sigma_d^2}}$$

Where:

S = sample result in activity (pCi/L or pCi/g)

D = duplicate sample results in activity (pCi/L or pCi/g)

σ_s^2 = sample 2-sigma error value

σ_d^2 = duplicate 2-sigma error value

DERs were reported for all radionuclide duplicate analyses and were compared to the acceptable limit of less than or equal to the laboratory-established QC limit of 2.13. All DERs were acceptable for radionuclides.

Field duplicate pairs were collected from the following locations and events:

- Duplicate-1 paired with J2D2-R2.
- Duplicate-2 paired with TMPZ-110.

The collection frequency of at least one per 20 groundwater samples was met for each required quarter. This meets the collection frequency of 5 percent needed to meet project objectives. According to EPA guidance, there are no specific criteria for evaluating field duplicates (EPA 2004 and 2008). Generally, field duplicate precision was less than 20 percent RPD for water samples for results that exceeded five times the reporting limit. Field duplicate precision was not assessed when results were less than five times the reporting limit. No data were qualified based on field duplicate precision.

2.1.8 Other Qualifications

Each of the paragraphs in this section addresses the following qualification scenarios and comment codes that are not already addressed in the larger review sections:

- Positive results for stable chemistries above the SQL, but less than the PQL (comment code “g”) as reported in Table 11.
- Other qualification including ICP serial dilution issues, results greater than the calibration range, and potentially crossed samples (included in comment code “j”) as reported in Table 12.
- Results replaced by more sensitive analytical method results (comment code “l”); these results are not listed in a table because data qualified as not reportable (X) are not and will not be included in any reporting of groundwater data.
- Results replaced by more sensitive analytical run (comment code “m”); these results are not listed in a table because data qualified as not reportable (X) are not and will not be included in any reporting of groundwater data. In addition, it is impractical to include a lengthy table in this document.
- Results for radiochemistries qualified due to tentative identification of analyte and inherent bias in analytical technique (comment code “o”) as reported in Tables 13 and 14, respectively.

Quantitation less than the practical quantitation limit for stable chemistries – The laboratory evaluated the SQL and PQL for each sample result. In cases where sample results were greater than the SQL, but less than the PQL, the laboratory qualified the results as estimated. Specifically, results with this scenario were qualified by the laboratory as “B” for metals and “J” for all other stable chemistry tests. During data validation, positive results less than the PQL but greater than or equal to the SQL were qualified as estimated (J). Qualitatively, the results are acceptable; however, these results were considered estimated, because as the value approaches the SQL, the accuracy of the measurement is less certain. In these cases, bias cannot be determined. All results qualified as estimated (J) for this reason are presented in Table 11 and were assigned the validation comment code “g” in the TIMET database.

Other stable chemistries qualifications – This category includes other issues that may affect data quality and for which qualifiers have been assigned. During this reporting period, the percent difference between the original analysis and the required ICP serial dilution exceeded the QC limit for certain total metals by ICP and ICP/MS. As such, the total metals results in affected samples were qualified as estimated (J). A negative bias was assessed to some results, when the serial dilution clearly indicated that the initial reported result was lower than the result from the dilution. This indicates the possibility

that matrix interference (chemical or spectral) may be suppressing the signal in the undiluted reported result. The qualified result due to this issue is included in Table 12 and was assigned the validation comment code “j” in the TIMET database. No data were rejected based on serial dilution results.

Secondly, one result for chloroform was reported at a concentration greater than the upper calibration range of the instrument, as listed in Table 12. No dilution was conducted on this sample, so the result was qualified as estimated (J) and assigned the validation comment code “j” in the TIMET database.

In addition, a possibility exists that the metals samples and/or data for samples PC-028 and PC-067 were inadvertently switched. While conducting the CAB analysis, the cation sums appeared to be exactly opposite from last semester. Further evaluation of all metals indicates that these two samples may have been switched during processing. Since this issue cannot be completely resolved, the metals results for these two samples were rejected (R) and assigned the comment code “j” in the TIMET database. Other analyses were reviewed and do not appear to be an issue. These rejected results are listed in Table 12 (Other Stable Chemistry) and Table 16 (Rejected Data).

Analytical method sensitivity – This qualification is meant only to select the most appropriate sample result for reporting when one or more values are reported for a given analyte using different analytical techniques. Specifically, radium-228 and uranium-235 results were obtained from both isotopic alpha spectroscopy analysis and gamma spectroscopy. Since the gamma spectroscopy results are less reliable than the isotopic analysis, the gamma spectroscopy results were flagged (X) as not reportable. Flagged results were assigned the comment code “l” in the TIMET database, but were not reported in a table because these results will not be used for reporting.

Analytical run sensitivity – This qualification is meant only to select the most appropriate sample result for reporting when one or more values are reported for a given analyte using identical analytical techniques, but from multiple analytical runs. Specifically, during this report period, chloroform and tetrachloroethene were detected at concentrations above the calibration range in some samples. In these cases, dilutions were required to bring the compounds’ responses within the calibration range for accurate quantitation. When this happens, all results are reported in the laboratory EDD (both the diluted and undiluted results for all VOC analytes). It is the responsibility of the reviewer to choose the most accurate result from the most sensitive run for each analyte. The reviewer chose the lowest dilution for all analytes that were not above the calibration range. As such, in the initial undiluted run, the chloroform and/or tetrachloroethene results (over the calibration range) were qualified as unreportable (X), while all other VOC results were reportable. Conversely, in the diluted run, chloroform and/or

tetrachloroethene results were reported, while the other VOC results were qualified as unreportable (X). Qualified results were also assigned the comment code “m” in the TIMET database. Because the “X” qualified results are not reported in any investigative report, no summary table was included.

Other qualification for radiochemistries – This category includes other radiochemistry issues that may affect data quality and for which qualifiers have been assigned. The qualifications are due to tentative identification of analytes and inherent bias in analytical technique as discussed in the following paragraphs. Results qualified for these reasons are included in Tables 13 and 14 and were also assigned the comment code “o” in the TIMET database.

Results for the following radionuclides were qualified as estimated because the identification of the peak was tentative in the gamma spectroscopy analysis:

- Actinium-228, ~~lead-212~~, lead-214, protactinium-234, ~~potassium-40~~, and thallium-208.

No bias is assigned as this is a qualitative issue and does not affect quantitation. Results qualified for this reason are listed in Table 13.

Bi-214 and Pb-214 results analyzed by Paragon using gamma spectroscopy may be biased low due to inherent bias in the analytical method. Results qualified for this reason are listed in Table 14.

2.1.9 CAB and TDS Balances

In addition to the data validation and results qualification discussed above, two comparison tests were conducted to verify the correctness of analyses using Standard Method 1030E ([American Public Health Association 2005](#)) as required by NDEP ([NDEP 2009d](#)). Cation-anion balance (CAB) and the ratio of measured TDS versus calculated TDS were evaluated. Based on the findings, the anion, cation, and/or TDS results were qualified as estimated when acceptance criteria were not met as follows. If the CAB criterion was not met, then the results for the anions and cations were qualified as estimated (J or UJ) and assigned the comment code “p” in the TIMET analytical database. If the TDS ratio criterion was not met, then the results for TDS were qualified as estimated (J) and also assigned the comment code “p” in the TIMET database. If *both* criteria were not met, then both the anion/cation and TDS results were qualified as estimated (J or UJ) and assigned the comment code “q” in the TIMET database. This allows the data user to quickly identify if both tests were unacceptable. TDS, cation, and anion results were qualified according to the method criteria and presented in Table 15 for this reporting period.

2.1.10 Summary of Rejected Groundwater Data

Based on the review summarized above, 146 sample results were rejected. Table 16 lists rejected data with the associated comment codes. Groundwater data collected during this reporting period were rejected due to (1) poor calibration response for acetonitrile and ethanol; (2) no spike recovery for cyanide; and (3) potential switched samples. All of the VOCs listed are typically “poor performers” that often result in low calibration responses. This scenario is not uncommon and does not indicate a system laboratory issue. The cause of the poor cyanide spike recoveries was not identified; however, the laboratory has subsequently analyzed successful cyanide matrix spike samples in similar matrices. Based on an evaluation of metals/cation results, it appears that two samples were switched. A complete resolution of the issue was not attainable, so results were rejected. All other data were usable to meet project objectives with the qualifications discussed in the sections above.

2.2 EVALUATION OF PARCCS PARAMETERS

Overall data quality was acceptable based on the critical indicator parameters, except for data specifically rejected and qualified as such (R). PARCCS parameters were reviewed for laboratory analytical results obtained during the groundwater monitoring conducted during this reporting period, and the sections below discuss the results of the evaluation for each indicated parameter.

2.2.1 Precision

Precision is the measure of the variability associated with an entire sampling and analysis process. It is the comparison among independent measurements as the result of repeated application of the same process under similar conditions. It is determined by analyzing field duplicate pairs, MSD pairs, and MD pairs. Precision is expressed as the RPD of a pair of values (or results) for stable chemistries and DER for radionuclides.

Field duplicate pairs were collected, analyzed, and evaluated for each analysis performed on every sample matrix. Frequencies of field duplicate pairs submitted to the laboratory for analysis were shown to be at least 1 per 20 as required to meet project objectives. Field duplicate precision for aqueous samples was generally acceptable. No data were qualified based on field duplicate precision.

The frequency criterion for MSD or MD pairs is 5 percent of the samples (per matrix) or one per each analytical batch of 20 or less per matrix. MSD or MD samples were collected, analyzed, and evaluated for each analysis performed on every sample matrix. The frequencies in which MSDs or MDs were

prepared and analyzed by the laboratory met the frequency requirement as stated above. Data listed in Table 10 were qualified because of laboratory duplicate precision. No data were rejected based on laboratory duplicate precision.

2.2.2 Accuracy

Accuracy is the degree to which a measurement agrees with its true value and is expressed as percent recovery. Accuracy is assessed by evaluating instrument calibrations and comparing MS, LCS, surrogate recoveries, and carrier/tracer yields with associated QC limits.

Instrument calibrations were evaluated against acceptable QC limits. During this reporting period results for three VOCs were rejected because the instrument response of the calibration standard was very low; which may cause biased low results or false negatives. Table 6 presents all analytical data qualified due to calibration issues.

The frequency criterion for MS and LCS is 5 percent of the samples per matrix or one per each analytical batch of 20 samples or less per matrix. MS and LCS samples were prepared, analyzed, and evaluated for each analysis performed at the proper frequency. The criteria for MS and LCS accuracy are based on recommended QC limits provided in EPA validation guidelines and on laboratory historical QC limits for those analytes not presented in validation guidelines. Table 9-8 presents groundwater data that were qualified or rejected during this reporting period based on spiked sample recoveries. Notably, cyanide results for several samples were rejected due to lack of recovery in MS and MSD samples.

Positive or negative signs were assigned to the qualifiers to indicate the expected bias, as indicated by the QC result. In some cases, the MS and MSD had different biases for the same sample; in which case no bias could be assigned.

Surrogate recoveries and carrier/tracer yields were within acceptable limits. As such, no data were qualified based on these QC measures.

In addition, matrix interferences that may result in inaccurate results were identified from serial dilutions conducted during ICP analysis. Table 12 lists results that were qualified based on serial dilution results.

2.2.3 Representativeness

Representativeness is a qualitative parameter and is defined by the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or a process

or environmental condition. Sample results were evaluated for representativeness by examining items related to sample collection, including COC documentation, sample labeling, collection dates, and condition of the samples upon receipt at the laboratory. Laboratory procedures also were examined, including anomalies reported by the laboratory, either upon receipt of the samples at the laboratory or during analytical processes, adherence to recommended holding times of samples prior to analysis, calibration of laboratory instruments, adherence to analytical methods, and completeness of data package documentation.

[Section 2.1.1](#) lists a number of issues that were observed during sample receipt at the laboratory. Each one is presented with the applicable resolution and a statement about its affect on data quality. It was determined that no significant affect on data quality was observed. This observation was made based on the trend charts presented in the Semiannual Groundwater Monitoring Report ([TIMET 2010](#)).

In addition to the issues discussed above, representativeness is evaluated by reviewing blanks (laboratory method blanks and trip blanks). Laboratory and field QC blanks contained detectable amounts of VOCs, metals, and radionuclides (listed in [Section 2.1.3](#)). Generally, concentrations detected in the blanks were considerably less than reported results for the field samples; therefore, these concentrations did not affect overall data quality. Common laboratory contaminants were qualified as estimated in sample results when detected in associated blanks. Sample results qualified based on laboratory blanks are presented in Table 7. The affected data were qualified as undetected (U) or estimated and biased high or low (J+/J-).

2.2.4 Completeness

Completeness is defined as the percentage of measurements judged to be valid. The validity of sample results is determined through the data validation process. All rejected sample results are considered to be incomplete. Data that are qualified as undetected (U), undetected at estimated reporting limits (UJ), and estimated (J) are considered to be valid and usable. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set.

For groundwater data collected during this reporting period, 146 results were rejected (R). The total number of validated sample result records in the groundwater database for this reporting period is 3,700 (contained in the table “EDD_ Results” in the TIMET analytical database found in Appendix A). If 146 results were rejected from a total of 3,700 reportable validated results, then the number of valid results is

3,554. The percent complete (valid and not rejected) is 96.0 percent. This meets the completeness goal of 90 percent for this event.

2.2.5 Comparability

Comparability of the data is a qualitative parameter that expresses the confidence with which one data set may be compared with another. Comparability of the data is achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions, and using standardized reporting formats and data validation procedures. Historical groundwater data collected prior to the data collected in the first quarter of 2005 were obtained from Severn Trent Laboratories, Inc. (STL) using methods comparable to current analytical methods. However, since 2005, results were obtained from Paragon using analytical techniques that are consistent from quarterly and semiannual events. As such, results from the last 5 years of groundwater monitoring are comparable within the dataset.

2.2.6 Sensitivity

Sensitivity is the measure of the signal from an instrument that represents an actual deflection or response above instrument noise. Analytical sensitivity is measured by the MDL and is reported with the necessary dilution factors, preparation factors, and dry-weight factors of an individual sample as the SQL. The sensitivity requirements were based on the laboratory's ability to detect and report consistent and reliable limits.

It is expected that when a direct comparison to approved applicable screening levels is conducted, some SQLs will exceed the corresponding levels. For the purposes of site characterization and remedy selection, non-detects with reporting limits that exceed screening levels will be compared to screening levels and plotted as "U" qualified data that exceed the screening level (with the notation that the results are non-detected above the screening level). Recommendations to supplement the data or confirm the absence/presence of the analyte with additional data collection will be made for both purposes. Usability for other scenarios will be determined on a case-by-case basis. Procedures for handling non-detects (whether above the screening level or not) will be addressed in future risk assessment work plans.

Scenarios involving dilutions, high moisture content, and matrix interference affect the SQL by raising it according to the dilution factor or percent moisture content. Dilutions were required for numerous metal, anion, and VOC analyses because of high concentrations. Whenever the concentration exceeded the linear range of the instrumentation, dilutions were analyzed. All dilutions were reported.

3.0 CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the conclusions and recommendations regarding usability of the data for the project objectives. Based on the evaluation of each data set, greater than 90 percent of the groundwater data obtained during this reporting period are valid (that is, not rejected) and acceptable for their intended use. Biased data will be used as follows:

- Biased high results, based on spike recoveries, surrogate recoveries, and blank contamination will be used as the upper limit of concentration for the analyte, recognizing that the actual value may be lower.
- Biased low results, based on spike surrogate recoveries and negative blank values, will be used as the lower limit of concentration for the analyte, recognizing that the actual value may be higher.

All validated data points may be considered for use in other purposes that extend beyond the original project objectives, including evaluation against screening levels and risk assessment with the appended qualifiers noted in this document. Limitations on data usability for future purposes may arise, but are not addressed in the scope of this document. These limitations will be identified through subsequent data evaluations and mitigated where possible by collecting additional data in future investigations. The DQO process will be used to design future workplans that will include a comprehensive analytical suite and ensure adequate coverage for assessing potential source areas and risk to receptors.

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TABLE 7
QUALIFICATION BASED ON LABORATORY BLANK CONTAMINATION
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

EVENT	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010086	1010086-1	AA-27	ALUMINIUM	500	76	97 B	U	b	UG/L
4Q2010	1010086	1010086-1	AA-27	BARIUM	500	0.93	8.3 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	CHROMIUM	50	2.6	16 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	IRON	500	25	49 B	U	b	UG/L
4Q2010	1010086	1010086-1	AA-27	MANGANESE	50	0.57	1.2 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	MOLYBDENUM	50	5.4	25 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	VANADIUM	50	2.7	15 B	U	b	UG/L
4Q2010	1010086	1010086-1	AA-27	ZIRCONIUM	100	2.5	5.4 B	U	b	UG/L
4Q2010	1010086	1010086-2	AA-UW1	BARIUM	500	0.93	7.8 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-UW1	IRON	500	25	75 B	U	b	UG/L
4Q2010	1010086	1010086-2	AA-UW1	MANGANESE	50	0.57	36 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-UW1	MERCURY	0.2	0.0097	0.042 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-UW1	MOLYBDENUM	50	5.4	22 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-UW1	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010086	1010086-2	AA-UW1	VANADIUM	50	2.7	39 B	U	b	UG/L
4Q2010	1010111	1010111-1	AA-01	BARIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010111	1010111-1	AA-01	MERCURY	0.2	0.0097	0.017 B	J-	b, g	UG/L
4Q2010	1010111	1010111-1	AA-01	VANADIUM	50	2.7	34 B	U	b	UG/L
4Q2010	1010111	1010111-3	PC-054	ALUMINIUM	500	76	220 B	U	b	UG/L
4Q2010	1010111	1010111-3	PC-054	BARIUM	500	0.93	7.7 B	J-	b, g	UG/L
4Q2010	1010111	1010111-3	PC-054	COBALT	50	2.2	2.7 B	U	b	UG/L
4Q2010	1010111	1010111-3	PC-054	IRON	500	25	72 B	U	b	UG/L
4Q2010	1010111	1010111-3	PC-054	MERCURY	0.2	0.0097	0.036 B	J-	b, g	UG/L
4Q2010	1010111	1010111-3	PC-054	MOLYBDENUM	50	5.4	24 B	J-	b, g	UG/L
4Q2010	1010111	1010111-3	PC-054	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010111	1010111-3	PC-054	ZIRCONIUM	100	2.5	3.1 B	U	b	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	BARIUM	500	0.93	13 B	J-	b, g	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	CHROMIUM	50	2.6	21 B	J-	b, g	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	MERCURY	0.2	0.0097	0.025 B	J-	b, g	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	VANADIUM	50	2.7	30 B	U	b	UG/L
4Q2010	1010111	1010111-7	BRW-R1	BARIUM	500	0.93	1.1 B	J-	b, g	UG/L
4Q2010	1010111	1010111-7	BRW-R1	CHROMIUM	50	2.6	30 B	J-	b, g	UG/L
4Q2010	1010111	1010111-7	BRW-R1	MERCURY	0.2	0.0097	0.04 B	J-	b, g	UG/L

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EVENT	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010111	1010111-7	BRW-R1	THALLIUM	0.2	0.016	0.03 B	U	b	UG/L
4Q2010	1010111	1010111-7	BRW-R1	VANADIUM	50	2.7	13 B	U	b	UG/L
4Q2010	1010126	1010126-1	DBMW-1	ALUMINIUM	500	76	86 B	U	b	UG/L
4Q2010	1010126	1010126-1	DBMW-1	BARIUM	500	0.93	5.1 B	J-	b, g	UG/L
4Q2010	1010126	1010126-1	DBMW-1	CHROMIUM	50	2.6	40 B	J-	b, g	UG/L
4Q2010	1010126	1010126-1	DBMW-1	THALLIUM	0.2	0.016	0.07 B	U	b	UG/L
4Q2010	1010126	1010126-1	DBMW-1	VANADIUM	50	2.7	32 B	U	b	UG/L
4Q2010	1010126	1010126-3	DBMW-3	ALUMINIUM	500	76	210 B	U	b	UG/L
4Q2010	1010126	1010126-3	DBMW-3	BARIUM	500	0.93	5.2 B	J-	b, g	UG/L
4Q2010	1010126	1010126-3	DBMW-3	IRON	500	25	200 B	U	b	UG/L
4Q2010	1010126	1010126-3	DBMW-3	MANGANESE	50	0.57	2.3 B	J-	b, g	UG/L
4Q2010	1010126	1010126-3	DBMW-3	PHOSPHORUS	1000	29	41 B	J-	b, g	UG/L
4Q2010	1010126	1010126-3	DBMW-3	VANADIUM	50	2.7	35 B	U	b	UG/L
4Q2010	1010126	1010126-3	DBMW-3	ZIRCONIUM	100	2.5	7.3 B	U	b	UG/L
4Q2010	1010159	1010159-1	PC-124	ALUMINIUM	500	76	95 B	U	b	UG/L
4Q2010	1010159	1010159-1	PC-124	BARIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	CHROMIUM	50	2.6	35 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	IRON	500	25	38 B	U	b	UG/L
4Q2010	1010159	1010159-1	PC-124	MERCURY	0.2	0.0097	0.011 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010159	1010159-1	PC-124	VANADIUM	50	2.7	28 B	U	b	UG/L
4Q2010	1010159	1010159-1	PC-124	ZIRCONIUM	100	2.5	4.8 B	U	b	UG/L
4Q2010	1010159	1010159-3	PC-024	ALUMINIUM	500	76	110 B	U	b	UG/L
4Q2010	1010159	1010159-3	PC-024	BARIUM	500	0.93	7.2 B	J-	b, g	UG/L
4Q2010	1010159	1010159-3	PC-024	IRON	500	25	54 B	U	b	UG/L
4Q2010	1010159	1010159-3	PC-024	MANGANESE	50	0.57	1.9 B	J-	b, g	UG/L
4Q2010	1010159	1010159-3	PC-024	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010159	1010159-3	PC-024	VANADIUM	50	2.7	25 B	U	b	UG/L
4Q2010	1010159	1010159-3	PC-024	ZIRCONIUM	100	2.5	4.7 B	U	b	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	BARIUM	500	0.93	5 B	J-	b, g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	CHROMIUM	50	2.6	5.8 B	J-	b, g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	MERCURY	0.2	0.0097	0.2 B	J-	b, g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	METHYLENE CHLORIDE	4	0.67	1.3 BJ	U	b	UG/L

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4Q2010	1010159	1010159-4	TIMETMW-4	MOLYBDENUM	50	5.4	30 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	BARIIUM	500	0.93	8.1 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	CHROMIUM	50	2.6	18 B	U	b	UG/L
4Q2010	1010177	1010177-1	AA-11	MANGANESE	50	0.57	0.67 B	U	b	UG/L
4Q2010	1010177	1010177-1	AA-11	MOLYBDENUM	50	5.4	32 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	THALLIUM	0.2	0.016	0.1 B	U	b	UG/L
4Q2010	1010177	1010177-1	AA-11	VANADIUM	50	2.7	26 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	ZIRCONIUM	100	2.5	2.7 B	J-	b, g	UG/L
4Q2010	1010177	1010177-2	AA-20	BARIIUM	500	0.93	4.6 B	J-	b, g	UG/L
4Q2010	1010177	1010177-2	AA-20	VANADIUM	50	2.7	33 B	J-	b, g	UG/L
4Q2010	1010177	1010177-2	AA-20	ZIRCONIUM	100	2.5	12 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	BARIIUM	500	0.93	10 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	MANGANESE	50	0.57	0.96 B	U	b	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	MOLYBDENUM	50	5.4	18 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	NICKEL	100	4.7	17 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	THALLIUM	0.2	0.016	0.06 B	U	b	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	VANADIUM	50	2.7	35 B	J-	b, g	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	BARIIUM	500	0.93	7.8 B	J-	b, g	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	CHROMIUM	50	2.6	22 B	U	b	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	MERCURY	0.2	0.0097	0.017 B	J-	b, g	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	THALLIUM	0.2	0.016	0.02 B	U	b	UG/L
4Q2010	1010201	1010201-1	CLD1-R	BARIIUM	500	0.93	11 B	J-	b, g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	NICKEL	100	4.7	4.9 B	J-	b, g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	THALLIUM	0.2	0.016	0.02 B	U	b	UG/L
4Q2010	1010201	1010201-2	CLD4-R	BARIIUM	500	0.93	3.7 B	J-	b, g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	BERYLLIUM	10	0.88	3.4 B	U	b	UG/L
4Q2010	1010201	1010201-2	CLD4-R	MANGANESE	50	0.57	4.4 B	U	b	UG/L
4Q2010	1010201	1010201-2	CLD4-R	THALLIUM	0.2	0.016	0.08 B	U	b	UG/L
4Q2010	1010201	1010201-4	POU-3	ALUMINIUM	500	76	180 B	J-	b, g	UG/L
4Q2010	1010201	1010201-4	POU-3	BARIIUM	500	0.93	26 B	J-	b, g	UG/L
4Q2010	1010201	1010201-4	POU-3	IRON	500	25	160 B	U	b	UG/L
4Q2010	1010201	1010201-4	POU-3	MANGANESE	50	0.57	25 B	U	b	UG/L
4Q2010	1010201	1010201-4	POU-3	THALLIUM	0.2	0.016	0.02 B	U	b	UG/L

TABLE 7
QUALIFICATION BASED ON LABORATORY BLANK CONTAMINATION
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

EVENT	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010201	1010201-4	POU-3	VANADIUM	50	2.7	17 B	J-	b, g	UG/L
4Q2010	1010201	1010201-4	POU-3	ZIRCONIUM	100	2.5	5.2 B	J-	b, g	UG/L
4Q2010	1010201	1010201-6	AA-09	BARIIUM	500	0.93	5.8 B	J-	b, g	UG/L
4Q2010	1010201	1010201-6	AA-09	THALLIUM	0.2	0.016	0.07 B	U	b	UG/L
4Q2010	1010201	1010201-6	AA-09	VANADIUM	50	2.7	30 B	J-	b, g	UG/L
4Q2010	1010201	1010201-6	AA-09	ZIRCONIUM	100	2.5	2.6 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	ALUMINIUM	500	76	380 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	BARIIUM	500	0.93	7.4 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	MANGANESE	50	0.57	7.1 B	U	b	UG/L
4Q2010	1010223	1010223-1	DBMW-5	MOLYBDENUM	50	5.4	36 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	TITANIUM	100	1.4	2.1 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	VANADIUM	50	2.7	16 B	J-	b, g	UG/L
4Q2010	1010223	1010223-3	DBMW-4	BARIIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010223	1010223-3	DBMW-4	IRON	500	25	190 B	U	b	UG/L
4Q2010	1010223	1010223-3	DBMW-4	MANGANESE	50	0.57	11 B	U	b	UG/L
4Q2010	1010223	1010223-3	DBMW-4	VANADIUM	50	2.7	43 B	J-	b, g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	BARIIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	CHROMIUM	50	2.6	47 B	U	b	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	MOLYBDENUM	50	5.4	19 B	J-	b, g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	THALLIUM	0.2	0.016	0.05 B	U	b	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	VANADIUM	50	2.7	49 B	J-	b, g	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	ALUMINIUM	500	76	78 B	U	b	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	BARIIUM	500	0.93	29 B	U	b	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	BERYLLIUM	10	0.88	1.9 B	U	b	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	IRON	500	25	42 B	U	b	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	MANGANESE	50	0.57	1.6 B	U	b	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	ZIRCONIUM	100	2.5	8.6 B	U	b	UG/L
4Q2010	1010422	1010422-1	J2D4	ACTINIUM-228	14		18.1 LTTI	J+	b, o	PCI/L
4Q2010	1010422	1010422-1	J2D4	BARIIUM	500	0.93	25 B	J-	b, g	UG/L
4Q2010	1010422	1010422-1	J2D4	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010422	1010422-1	J2D4	ZIRCONIUM	100	2.5	8.2 B	U	b	UG/L
4Q2010	1010445	1010445-1	J2U2	ACTINIUM-228	17.4		17.8 LTTI	J+	b, o	PCI/L

TABLE 7
QUALIFICATION BASED ON LABORATORY BLANK CONTAMINATION
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

EVENT	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010445	1010445-1	J2U2	BARIIUM	500	0.93	18 B	J-	b, g	UG/L
4Q2010	1010445	1010445-1	J2U2	MOLYBDENUM	50	5.4	29 B	J-	b, g	UG/L
4Q2010	1010445	1010445-1	J2U2	THALLIUM	0.2	0.016	0.1 B	U	b	UG/L
4Q2010	1010445	1010445-1	J2U2	VANADIUM	50	2.7	30 B	U	b	UG/L
4Q2010	1010445	1010445-1	J2U2	ZIRCONIUM	100	2.5	6.4 B	U	b	UG/L
4Q2010	1010445	1010445-3	J2D3	BARIIUM	500	0.93	22 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	CHROMIUM	50	2.6	29 B	U	b	UG/L
4Q2010	1010445	1010445-3	J2D3	MANGANESE	50	0.57	35 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	MERCURY	0.2	0.0097	0.012 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	MOLYBDENUM	50	5.4	43 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	THALLIUM	0.2	0.016	0.04 B	U	b	UG/L
4Q2010	1010445	1010445-3	J2D3	VANADIUM	50	2.7	32 B	U	b	UG/L
4Q2010	1010445	1010445-3	J2D3	ZINC	100	3.6	6.5 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	ZIRCONIUM	100	2.5	7.6 B	U	b	UG/L

Notes

+/- Result may be biased high/low, respectively
UG/L Microgram per liter
NA Not applicable
PQL Practical quantitation limit
SDG Sample delivery group

Qualifiers/Comments

b Comment code for blank contamination
B Indicates detected result less than PQL
J Estimated value
LT Result less than requested MDA
o Comment code for other radiochemistry issues
TI Tentative peak identification
U Undetected

1 Result field includes the numerical concentration and the laboratory qualifier or code.

TABLE 8
QUALIFICATION BASED ON SPIKE RECOVERY
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
J2D2-R2 MS/MSD Cyanide = 0/0 %R (QC Limits 75 - 125 %R)										
4Q2010	1010201	1010201-1	CLD1-R	CYANIDE	0.01	0.0017	0.01 U	R	h, e	MG/L
4Q2010	1010201	1010201-2	CLD4-R	CYANIDE	0.01	0.0017	0.01 U	R	h, e	MG/L
4Q2010	1010201	1010201-4	POU-3	CYANIDE	0.01	0.0017	0.01 U	R	h, e	MG/L
4Q2010	1010201	1010201-6	AA-09	CYANIDE	0.01	0.0017	0.01 U	R	h, e	MG/L
4Q2010	1010223	1010223-1	DBMW-5	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010223	1010223-3	DBMW-4	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010223	1010223-5	J2D2-R2	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010263	1010263-1	PC-67	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010263	1010263-3	PC-28	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010327	1010327-1	J2D1-R2	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
J2D4 MS/MSD Cyanide = 0/0 %R (QC Limits 75 - 125 %R)										
4Q2010	1010422	1010422-1	J2D4	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010445	1010445-1	J2U2	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
4Q2010	1010445	1010445-3	J2D3-R	CYANIDE	0.01	0.0017	0.01 U	R	e, h	MG/L
J2D2-R2 MS Gross alpha = 60.5 %R (QC Limits 75 - 125 %R)										
4Q2010	1010201	1010201-1	CLD1-R	GROSS ALPHA	8.9	8.9	9.67 M3	J-	e	PCI/L
4Q2010	1010201	1010201-2	CLD4-R	GROSS ALPHA	15.1	15.1	19.5 M3	J-	e	PCI/L
4Q2010	1010223	1010223-5	J2D2-R2	GROSS ALPHA	12.9	12.9	40.1 M3	J-	e	PCI/L
TMPZ-105 MS/MSD = 121/133 %R (QC Limits 75 - 125 %R)										
4Q2010	1010282	1010282-1	TMPZ-105	PERCHLORATE	2	2	37	J+	e	MG/L
4Q2010	1010282	1010282-3	TMPZ-106	PERCHLORATE	0.4	0.4	2.8	J+	e	MG/L
J2D1-R2 MS/MSD Potassium = 128/129 %R (QC Limits 75 - 125 %R)										
4Q2010	1010327	1010327-1	J2D1-R2	POTASSIUM	5000	540	27000	J+	e	UG/L
4Q2010	1010422	1010422-1	J2D4	TOC	1	0.12	1 U	UJ-	e	MG/L
4Q2010	1010445	1010445-1	J2U2	TOC	1	0.12	1 U	UJ-	e	MG/L
4Q2010	1010445	1010445-3	J2D3-R	TOC	1	0.12	1 U	UJ-	e	MG/L

Notes:

Qualifiers/Comments:

%R Percent Recovery
UG/L Microgram per liter
MG/L Milligram per liter
MS Matrix spike
MSD Matrix spike duplicate

+/- Result may be biased high/low
e Comment code for spike recovery
h Comment code for holding time/sample receipt
J Estimated Value
M3 Requested minimum detectable activity was not met

TABLE 8
QUALIFICATION BASED ON SPIKE RECOVERY
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
Notes (continued):										
PCI/L		PicoCurie per liter								
PQL		Practical quantitation limit			R				Rejected value	
QC		Quality control			UJ				Undetected at quantitation limits	
SDG		Sample delivery group								
SQL		Sample quantitation limit								

¹ Result field includes the numerical concentration and the laboratory qualifier or code

TABLE 11
QUALIFICATION WHEN RESULTS ARE BELOW PQL
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010086	1010086-1	AA-27	BARIUM	500	0.93	8.3 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	CHROMIUM	50	2.6	16 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	MANGANESE	50	0.57	1.2 B	J-	b, g	UG/L
4Q2010	1010086	1010086-1	AA-27	MOLYBDENUM	50	5.4	25 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	1,1-DICHLOROETHANE	2	0.32	0.86 J	J	g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	BARIUM	500	0.93	7.8 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	CHLOROFORM	2	0.36	0.95 J	J	g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	MANGANESE	50	0.57	36 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	MERCURY	0.2	0.0097	0.042 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	MOLYBDENUM	50	5.4	22 B	J-	b, g	UG/L
4Q2010	1010086	1010086-2	AA-JW1	TRICHLOROETHENE	2	0.34	0.39 J	J	g	UG/L
4Q2010	101011	1010111-1	AA-01	BARIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	101011	1010111-1	AA-01	MERCURY	0.2	0.0097	0.017 B	J-	b, g	UG/L
4Q2010	101011	1010111-1	AA-01	TRICHLOROETHENE	2	0.34	0.42 J	J	g	UG/L
4Q2010	101011	1010111-3	PC-054	1,2-DICHLOROBENZENE	2	0.44	1.4 J	J	g	UG/L
4Q2010	101011	1010111-3	PC-054	1,4-DICHLOROBENZENE	2	0.4	1.4 J	J	g	UG/L
4Q2010	101011	1010111-3	PC-054	BARIUM	500	0.93	7.7 B	J-	b, g	UG/L
4Q2010	101011	1010111-3	PC-054	MERCURY	0.2	0.0097	0.036 B	J-	b, g	UG/L
4Q2010	101011	1010111-3	PC-054	MOLYBDENUM	50	5.4	24 B	J-	b, g	UG/L
4Q2010	101011	1010111-3	PC-054	SILVER	50	5.4	6.6 B	J	g	UG/L
4Q2010	101011	1010111-3	PC-054	TETRACHLOROETHENE	2	0.36	1.6 J	J	g	UG/L
4Q2010	101011	1010111-5	TIMETMW-3R	1,2-DICHLOROETHANE	1	0.18	0.46 J	J	g	UG/L
4Q2010	101011	1010111-5	TIMETMW-3R	BARIUM	500	0.93	13 B	J-	b, g	UG/L
4Q2010	101011	1010111-5	TIMETMW-3R	CHLOROFORM	1	0.18	0.9 J	J	g	UG/L
4Q2010	101011	1010111-5	TIMETMW-3R	CHROMIUM	50	2.6	21 B	J-	b, g	UG/L
4Q2010	101011	1010111-5	TIMETMW-3R	MERCURY	0.2	0.0097	0.025 B	J-	b, g	UG/L
4Q2010	101011	1010111-7	BRW-R1	BARIUM	500	0.93	1.1 B	J-	b, g	UG/L
4Q2010	101011	1010111-7	BRW-R1	CHROMIUM	50	2.6	30 B	J-	b, g	UG/L
4Q2010	101011	1010111-7	BRW-R1	MERCURY	0.2	0.0097	0.04 B	J-	b, g	UG/L
4Q2010	1010126	1010126-1	DBMW-1	BARIUM	500	0.93	5.1 B	J-	b, g	UG/L
4Q2010	1010126	1010126-1	DBMW-1	CHROMIUM	50	2.6	40 B	J-	b, g	UG/L
4Q2010	1010126	1010126-3	DBMW-3	BARIUM	500	0.93	5.2 B	J-	b, g	UG/L
4Q2010	1010126	1010126-3	DBMW-3	MANGANESE	50	0.57	2.3 B	J-	b, g	UG/L

TABLE 11
QUALIFICATION WHEN RESULTS ARE BELOW PQL
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010126	1010126-3	DBMW-3	PHOSPHORUS	1000	29	41 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	1,1-DICHLOROETHANE	1	0.16	0.21 J	J	g	UG/L
4Q2010	1010159	1010159-1	PC-124	BARIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	CARBON TETRACHLORIDE	1	0.17	0.76 J	J	g	UG/L
4Q2010	1010159	1010159-1	PC-124	CHROMIUM	50	2.6	35 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	CIS-1,2-DICHLOROETHENE	1	0.17	0.2 J	J	g	UG/L
4Q2010	1010159	1010159-1	PC-124	MERCURY	0.2	0.0097	0.011 B	J-	b, g	UG/L
4Q2010	1010159	1010159-1	PC-124	TETRACHLOROETHENE	1	0.18	0.98 J	J	g	UG/L
4Q2010	1010159	1010159-3	PC-024	1,1-DICHLOROETHANE	1	0.16	0.37 J	J	g	UG/L
4Q2010	1010159	1010159-3	PC-024	BARIUM	500	0.93	7.2 B	J-	b, g	UG/L
4Q2010	1010159	1010159-3	PC-024	CIS-1,2-DICHLOROETHENE	1	0.17	0.17 J	J	g	UG/L
4Q2010	1010159	1010159-3	PC-024	MANGANESE	50	0.57	1.9 B	J-	b, g	UG/L
4Q2010	1010159	1010159-3	PC-024	TRICHLOROETHENE	1	0.17	0.97 J	J	g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	1,1-DICHLOROETHENE	4	0.72	3.6 J	J	g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	BARIUM	500	0.93	5 B	J-	b, g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	CHLOROFORM	4	0.72	2.2 J	J	g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	CHROMIUM	50	2.6	5.8 B	J-	b, g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	MERCURY	0.2	0.0097	0.2 B	J-	b, g	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	MOLYBDENUM	50	5.4	30 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	1,1-DICHLOROETHANE	1	0.16	0.26 J	J	g	UG/L
4Q2010	1010177	1010177-1	AA-11	1,1-DICHLOROETHENE	1	0.18	0.65 J	J	g	UG/L
4Q2010	1010177	1010177-1	AA-11	BARIUM	500	0.93	8.1 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	MOLYBDENUM	50	5.4	32 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	VANADIUM	50	2.7	26 B	J-	b, g	UG/L
4Q2010	1010177	1010177-1	AA-11	ZIRCONIUM	100	2.5	2.7 B	J-	b, g	UG/L
4Q2010	1010177	1010177-2	AA-20	BARIUM	500	0.93	4.6 B	J-	b, g	UG/L
4Q2010	1010177	1010177-2	AA-20	CARBON TETRACHLORIDE	2	0.34	1.4 J	J	g	UG/L
4Q2010	1010177	1010177-2	AA-20	METHYL-T-BUTYL ETHER	2	0.33	0.52 J	J	g	UG/L
4Q2010	1010177	1010177-2	AA-20	TRICHLOROETHENE	2	0.34	0.56 J	J	g	UG/L
4Q2010	1010177	1010177-2	AA-20	VANADIUM	50	2.7	33 B	J-	b, g	UG/L
4Q2010	1010177	1010177-2	AA-20	ZIRCONIUM	100	2.5	12 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	1,1-DICHLOROETHENE	1	0.18	0.31 J	J	g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	BARIUM	500	0.93	10 B	J-	b, g	UG/L

TABLE 11
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Event	SDG	Lab ID	Sample ID	Analyte		PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010177	1010177-4	TIMETMW-6R	CARBON TETRACHLORIDE		1	0.17	0.27 J	J	g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	MOLYBDENUM		50	5.4	18 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	NICKEL		100	4.7	17 B	J-	b, g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	TETRACHLOROETHENE		1	0.18	0.46 J	J	g	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	VANADIUM		50	2.7	35 B	J-	b, g	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	BARIIUM		500	0.93	7.8 B	J-	b, g	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	MERCURY		0.2	0.0097	0.017 B	J-	b, g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	1,2,3-TRICHLOROBENZENE		2	0.44	0.51 J	J	g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	BARIIUM		500	0.93	11 B	J-	b, g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	BROMODICHLOROMETHANE		2	0.44	1.3 J	J	g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	CHLOROBENZENE		2	0.38	0.48 J	J	g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	NICKEL		100	4.7	4.9 B	J-	b, g	UG/L
4Q2010	1010201	1010201-1	CLD1-R	TETRACHLOROETHENE		2	0.36	1.6 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	1,1-DICHLOROETHANE		2	0.32	0.53 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	1,1-DICHLOROETHENE		2	0.36	1.1 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	1,2-DICHLOROPROPANE		2	0.34	0.41 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	BARIIUM		500	0.93	3.7 B	J-	b, g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	BROMOFORM		2	0.58	0.86 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	DIBROMOCHLOROMETHANE		2	0.5	0.72 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	TETRACHLOROETHENE		2	0.36	1.1 J	J	g	UG/L
4Q2010	1010201	1010201-2	CLD4-R	TRICHLOROETHENE		2	0.34	0.41 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,1-DICHLOROETHANE		2	0.32	1.3 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,1-DICHLOROPROPENE		10	0.34	0.52 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,2,3-TRICHLOROPROPANE		10	0.62	2.3 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,2-DICHLOROETHANE		2	0.36	2 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,2-DICHLOROPROPANE		2	0.34	1.7 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,3-DICHLOROBENZENE		2	0.4	0.92 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	1,4-DICHLOROBENZENE		2	0.4	1.8 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	ALUMINIUM		500	76	180 B	J-	b, g	UG/L
4Q2010	1010201	1010201-4	POU-3	BARIIUM		500	0.93	26 B	J-	b, g	UG/L
4Q2010	1010201	1010201-4	POU-3	CHLOROBENZENE		2	0.38	0.96 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	CIS-1,2-DICHLOROETHENE		2	0.34	1.3 J	J	g	UG/L
4Q2010	1010201	1010201-4	POU-3	VANADIUM		50	2.7	17 B	J-	b, g	UG/L

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Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010201	1010201-4	POU-3	ZIRCONIUM	100	2.5	5.2 B	J-	b, g	UG/L
4Q2010	1010201	1010201-6	AA-09	1,1-DICHLOROETHENE	2	0.36	0.93 J	J	g	UG/L
4Q2010	1010201	1010201-6	AA-09	BARIUM	500	0.93	5.8 B	J-	b, g	UG/L
4Q2010	1010201	1010201-6	AA-09	CARBON TETRACHLORIDE	2	0.34	0.88 J	J	g	UG/L
4Q2010	1010201	1010201-6	AA-09	TRICHLOROETHENE	2	0.34	0.67 J	J	g	UG/L
4Q2010	1010201	1010201-6	AA-09	VANADIUM	50	2.7	30 B	J-	b, g	UG/L
4Q2010	1010201	1010201-6	AA-09	ZIRCONIUM	100	2.5	2.6 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	ALUMINUM	500	76	380 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	BARIUM	500	0.93	7.4 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	CARBON TETRACHLORIDE	2	0.34	1.1 J	J	g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	MOLYBDENUM	50	5.4	36 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	SELENIUM	25	13	20 B	J	g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	TETRACHLOROETHENE	2	0.36	1.8 J	J	g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	TITANIUM	100	1.4	2.1 B	J-	b, g	UG/L
4Q2010	1010223	1010223-1	DBMW-5	VANADIUM	50	2.7	16 B	J-	b, g	UG/L
4Q2010	1010223	1010223-3	DBMW-4	BARIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010223	1010223-3	DBMW-4	CARBON TETRACHLORIDE	2	0.34	1.4 J	J	g	UG/L
4Q2010	1010223	1010223-3	DBMW-4	VANADIUM	50	2.7	43 B	J-	b, g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	1,1-DICHLOROETHANE	1	0.16	0.42 J	J	g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	1,1-DICHLOROETHENE	1	0.18	0.79 J	J	g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	BARIUM	500	0.93	12 B	J-	b, g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	MOLYBDENUM	50	5.4	19 B	J-	b, g	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	VANADIUM	50	2.7	49 B	J-	b, g	UG/L
4Q2010	1010263	1010263-1	PC-067	1,1-DICHLOROETHANE	2	0.32	0.48 J	J	g	UG/L
4Q2010	1010263	1010263-1	PC-067	BROMODICHLOROMETHANE	2	0.44	0.99 J	J	g	UG/L
4Q2010	1010263	1010263-1	PC-067	TRICHLOROETHENE	2	0.34	1.1 J	J	g	UG/L
4Q2010	1010263	1010263-3	PC-028	TETRACHLOROETHENE	2	0.36	1.1 J	J	g	UG/L
4Q2010	1010263	1010263-3	PC-028	TRICHLOROETHENE	2	0.34	0.83 J	J	g	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	CARBON TETRACHLORIDE	2	0.34	0.7 J	J	g	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	NICKEL	100	4.7	8.7 B	J	g	UG/L
4Q2010	1010327	1010327-1	J2D1-R2	TRICHLOROETHENE	2	0.34	1 J	J	g	UG/L
4Q2010	1010327	1010327-3	M-129	TETRACHLOROETHENE	2	0.36	1.2 J	J	g	UG/L
4Q2010	1010422	1010422-1	J2D4	1,1-DICHLOROETHENE	2	0.36	0.65 J	J	g	UG/L

TABLE 11
QUALIFICATION WHEN RESULTS ARE BELOW PQL
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Event	SDG	Lab ID	Sample ID	Analyte		PQL	SQL	Results ¹	Qualifier	Comment	Unit
4Q2010	1010422	1010422-1	J2D4	BARIUM		500	0.93	25 B	J-	b, g	UG/L
4Q2010	1010422	1010422-1	J2D4	BROMOFORM		2	0.58	1.7 J	J	g	UG/L
4Q2010	1010445	1010445-1	J2U2	1,1-DICHLOROETHANE		1	0.16	0.21 J	J	g	UG/L
4Q2010	1010445	1010445-1	J2U2	1,1-DICHLOROETHENE		1	0.18	0.51 J	J	g	UG/L
4Q2010	1010445	1010445-1	J2U2	1,4-DICHLOROBENZENE		1	0.2	0.23 J	J	g	UG/L
4Q2010	1010445	1010445-1	J2U2	BARIUM		500	0.93	18 B	J-	b, g	UG/L
4Q2010	1010445	1010445-1	J2U2	BROMODICHLOROMETHANE		1	0.22	0.25 J	J	g	UG/L
4Q2010	1010445	1010445-1	J2U2	MOLYBDENUM		50	5.4	29 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	BARIUM		500	0.93	22 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	CARBON TETRACHLORIDE		1	0.17	0.54 J	J	g	UG/L
4Q2010	1010445	1010445-3	J2D3	MANGANESE		50	0.57	35 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	MERCURY		0.2	0.0097	0.012 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	MOLYBDENUM		50	5.4	43 B	J-	b, g	UG/L
4Q2010	1010445	1010445-3	J2D3	TRICHLOROETHENE		1	0.17	0.53 J	J	g	UG/L
4Q2010	1010445	1010445-3	J2D3	ZINC		100	3.6	6.5 B	J-	b, g	UG/L
4Q2010	1011024	1011024-1	M-130	TETRACHLOROETHENE		2	0.36	0.71 J	J	g	UG/L

Notes:

+/- Result may be biased high/low, respectively
UG/L Microgram per liter
PQL Practical quantitation limit
SDG Sample delivery group
SQL Sample quantitation limit

Qualifiers/Comments:

B Indicates detected result less than PQL
b Comment for qualification due to blanks.
g Comment code for results detected less than PQL
J Estimated value

¹ Result field includes the numerical concentration and the laboratory qualifier or code.

TABLE 12
OTHER STABLE CHEMISTRY QUALIFICATIONS
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Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
Serial Dilution Exceedances:										
AA-27 SD Boron = 12%; Calcium = 13%; Lithium = 24%; Magnesium = 16%; Silicon = 17%; Sodium = 15%; Strontium = 15% (QC Limit ≤ 10 %D)										
4Q2010	1010086	1010086-1	AA-27	BORON	500	15	2800	J-	j	UG/L
4Q2010	1010086	1010086-1	AA-27	CALCIUM	2500	60	560000	J-	j	UG/L
4Q2010	1010086	1010086-1	AA-27	LITHIUM	50	1.3	220	J+	j	UG/L
4Q2010	1010086	1010086-1	AA-27	MAGNESIUM	5000	65	180000	J-	j	UG/L
4Q2010	1010086	1010086-1	AA-27	SILICON	250	22	38000	J-	j	UG/L
4Q2010	1010086	1010086-1	AA-27	SODIUM	5000	33	420000	J-	j	UG/L
4Q2010	1010086	1010086-1	AA-27	STRONTIUM	50	0.39	9700	J-	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	BORON	500	15	2600	J-	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	CALCIUM	2500	60	590000	J-	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	LITHIUM	50	1.3	170	J+	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	MAGNESIUM	5000	65	200000	J-	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	SILICON	250	22	39000	J-	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	SODIUM	5000	33	260000	J-	j	UG/L
4Q2010	1010086	1010086-2	AA-UW1	STRONTIUM	50	0.39	10000	J-	j	UG/L
4Q2010	1010111	1010111-1	AA-01	BORON	500	15	1200	J-	j	UG/L
4Q2010	1010111	1010111-1	AA-01	CALCIUM	2500	60	550000	J-	j	UG/L
4Q2010	1010111	1010111-1	AA-01	LITHIUM	50	1.3	210	J+	j	UG/L
4Q2010	1010111	1010111-1	AA-01	MAGNESIUM	5000	65	180000	J-	j	UG/L
4Q2010	1010111	1010111-1	AA-01	SILICON	250	22	39000	J-	j	UG/L
4Q2010	1010111	1010111-1	AA-01	SODIUM	5000	33	360000	J-	j	UG/L
4Q2010	1010111	1010111-1	AA-01	STRONTIUM	50	0.39	13000	J-	j	UG/L
4Q2010	1010111	1010111-3	PC-054	BORON	500	15	7100	J-	j	UG/L
4Q2010	1010111	1010111-3	PC-054	CALCIUM	2500	60	540000	J-	j	UG/L
4Q2010	1010111	1010111-3	PC-054	LITHIUM	50	1.3	480	J+	j	UG/L
4Q2010	1010111	1010111-3	PC-054	MAGNESIUM	5000	65	200000	J-	j	UG/L
4Q2010	1010111	1010111-3	PC-054	SILICON	250	22	41000	J-	j	UG/L
4Q2010	1010111	1010111-3	PC-054	SODIUM	5000	33	730000	J-	j	UG/L
4Q2010	1010111	1010111-3	PC-054	STRONTIUM	50	0.39	12000	J-	j	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	BORON	500	15	3400	J-	j	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	CALCIUM	2500	60	140000	J-	j, p	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	LITHIUM	50	1.3	120	J+	j	UG/L

TABLE 12
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Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
4Q2010	1010111	1010111-5	TIMETMW-3R	MAGNESIUM	5000	65	86000	J-	j, p	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	SILICON	250	22	33000	J-	j	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	SODIUM	5000	33	280000	J-	j, p	UG/L
4Q2010	1010111	1010111-5	TIMETMW-3R	STRONTIUM	50	0.39	3400	J-	j	UG/L
4Q2010	1010111	1010111-7	BRW-R1	BORON	500	15	4600	J-	j	UG/L
4Q2010	1010111	1010111-7	BRW-R1	CALCIUM	2500	60	360000	J-	j, p	UG/L
4Q2010	1010111	1010111-7	BRW-R1	LITHIUM	50	1.3	160	J+	j	UG/L
4Q2010	1010111	1010111-7	BRW-R1	MAGNESIUM	5000	65	170000	J-	j, p	UG/L
4Q2010	1010111	1010111-7	BRW-R1	SILICON	250	22	16000	J-	j	UG/L
4Q2010	1010111	1010111-7	BRW-R1	SODIUM	5000	33	410000	J-	j, p	UG/L
4Q2010	1010111	1010111-7	BRW-R1	STRONTIUM	50	0.39	7700	J-	j	UG/L
4Q2010	1010126	1010126-1	DBMW-1	BORON	500	15	2900	J-	j	UG/L
4Q2010	1010126	1010126-1	DBMW-1	CALCIUM	2500	60	630000	J-	j, p	UG/L
4Q2010	1010126	1010126-1	DBMW-1	CHLOROFORM	5	0.9	65 E	J	j	UG/L
4Q2010	1010126	1010126-1	DBMW-1	LITHIUM	50	1.3	390	J+	j	UG/L
4Q2010	1010126	1010126-1	DBMW-1	MAGNESIUM	5000	65	270000	J-	j, p	UG/L
4Q2010	1010126	1010126-1	DBMW-1	SILICON	250	22	33000	J-	j	UG/L
4Q2010	1010126	1010126-1	DBMW-1	SODIUM	5000	33	630000	J-	j, p	UG/L
4Q2010	1010126	1010126-1	DBMW-1	STRONTIUM	50	0.39	15000	J-	j	UG/L
4Q2010	1010126	1010126-3	DBMW-3	BORON	500	15	4100	J-	j	UG/L
4Q2010	1010126	1010126-3	DBMW-3	CALCIUM	2500	60	570000	J-	j, p	UG/L
4Q2010	1010126	1010126-3	DBMW-3	LITHIUM	50	1.3	550	J+	j	UG/L
4Q2010	1010126	1010126-3	DBMW-3	MAGNESIUM	5000	65	450000	J-	j, p	UG/L
4Q2010	1010126	1010126-3	DBMW-3	SILICON	250	22	30000	J-	j	UG/L
4Q2010	1010126	1010126-3	DBMW-3	SODIUM	50000	330	1200000	J-	j, p	UG/L
4Q2010	1010126	1010126-3	DBMW-3	STRONTIUM	50	0.39	12000	J-	j	UG/L
4Q2010	1010159	1010159-1	PC-124	BORON	500	15	4000	J-	j	UG/L
4Q2010	1010159	1010159-1	PC-124	CALCIUM	2500	60	890000	J-	j	UG/L
4Q2010	1010159	1010159-1	PC-124	LITHIUM	50	1.3	460	J+	j	UG/L
4Q2010	1010159	1010159-1	PC-124	MAGNESIUM	5000	65	350000	J-	j	UG/L
4Q2010	1010159	1010159-1	PC-124	SILICON	250	22	39000	J-	j	UG/L
4Q2010	1010159	1010159-1	PC-124	SODIUM	5000	33	920000	J-	j	UG/L
4Q2010	1010159	1010159-1	PC-124	STRONTIUM	50	0.39	17000	J-	j	UG/L
4Q2010	1010159	1010159-3	PC-024	BORON	500	15	3400	J-	j	UG/L

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Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
4Q2010	1010159	1010159-3	PC-024	CALCIUM	2500	60	1000000	J-	j	UG/L
4Q2010	1010159	1010159-3	PC-024	LITHIUM	50	1.3	540	J+	j	UG/L
4Q2010	1010159	1010159-3	PC-024	MAGNESIUM	5000	65	410000	J-	j	UG/L
4Q2010	1010159	1010159-3	PC-024	SILICON	250	22	35000	J-	j	UG/L
4Q2010	1010159	1010159-3	PC-024	SODIUM	25000	160	1500000	J-	j	UG/L
4Q2010	1010159	1010159-3	PC-024	STRONTIUM	50	0.39	27000	J-	j	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	BORON	500	15	2400	J-	j	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	CALCIUM	2500	60	320000	J-	j, p	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	LITHIUM	50	1.3	120	J+	j	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	MAGNESIUM	5000	65	150000	J-	j, p	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	SILICON	250	22	39000	J-	j	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	SODIUM	5000	33	330000	J-	j, p	UG/L
4Q2010	1010159	1010159-4	TIMETMW-4	STRONTIUM	50	0.39	6500	J-	j	UG/L
AA-27 SD Lithium = 24% (QC Limit ≤ 10 %D)										
4Q2010	1010177	1010177-1	AA-11	LITHIUM	50	1.3	290	J+	j	UG/L
4Q2010	1010177	1010177-2	AA-20	LITHIUM	50	1.3	290	J+	j	UG/L
4Q2010	1010177	1010177-4	TIMETMW-6R	LITHIUM	50	1.3	290	J+	j	UG/L
4Q2010	1010177	1010177-5	TIMETMW-5	LITHIUM	50	1.3	170	J+	j	UG/L
J2D2-R2 SD Lithium = 29% (QC Limit ≤ 10 %D)										
4Q2010	1010201	1010201-1	CLD1-R	LITHIUM	50	1.3	320	J+	j	UG/L
4Q2010	1010201	1010201-2	CLD4-R	LITHIUM	50	1.3	140	J+	j	UG/L
4Q2010	1010201	1010201-4	POU-3	LITHIUM	50	1.3	230	J+	j	UG/L
4Q2010	1010201	1010201-6	AA-09	LITHIUM	50	1.3	180	J+	j	UG/L
4Q2010	1010223	1010223-1	DBMW-5	LITHIUM	50	1.3	340	J+	j	UG/L
4Q2010	1010223	1010223-3	DBMW-4	LITHIUM	50	1.3	320	J+	j	UG/L
4Q2010	1010223	1010223-5	J2D2-R2	LITHIUM	50	1.3	480	J+	j	UG/L
J2D1-R2 SD Lithium = 15% (QC Limit ≤ 10 %D)										
4Q2010	1010327	1010327-1	J2D1-R2	LITHIUM	50	1.3	450	J+	j	UG/L
J2U2 SD Lithium = 28% (QC Limit ≤ 10 %D)										
4Q2010	1010422	1010422-1	J2D4	LITHIUM	50	1.3	560	J+	j	UG/L
4Q2010	1010445	1010445-1	J2U2	LITHIUM	50	1.3	440	J+	j	UG/L
4Q2010	1010445	1010445-3	J2D3	LITHIUM	50	1.3	220	J+	j	UG/L
Reported value above calibration range										
4Q2010	1010263	1010263-3	PC-028	CHLOROFORM	2	0.36	150 E	J	j	UG/L

TABLE 12
OTHER STABLE CHEMISTRY QUALIFICATIONS
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
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Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
Potentially switched metals results between PC-067 and PC-028:										
4Q2010	1010263	1010263-1	PC-067	ALUMINUM	500	76	130 B	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	ANTIMONY	100	15	100 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	ARSENIC	2	0.15	230	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	BARIIUM	500	0.93	12 B	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	BERYLLIUM	10	0.88	10 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	BORON	500	15	5900	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	CADMIUM	25	1.6	25 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	CALCIUM	2500	60	640000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	CHROMIUM	50	2.6	1200	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	COBALT	50	2.2	50 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	COPPER	50	4.8	50 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	IRON	500	25	110 B	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	LEAD	15	6.4	15 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	LITHIUM	50	1.3	440	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	MAGNESIUM	5000	65	210000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	MANGANESE	50	0.57	2.4 B	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	MERCURY	0.2	0.0097	0.2 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	MOLYBDENUM	50	5.4	31 B	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	NICKEL	100	4.7	100 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	PHOSPHORUS	1000	29	1000 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	POTASSIUM	5000	540	12000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	SELENIUM	25	13	25 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	SILICON	250	22	39000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	SILVER	50	5.4	50 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	SODIUM	5000	33	960000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	STRONTIUM	50	0.39	12000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	THALLIUM	0.2	0.016	0.05 B	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	TIN	250	14	250 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	TITANIUM	100	1.4	100 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	TOTAL SULFUR	5000	230	800000	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	URANIUM	0.1	0.029	110	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	VANADIUM	50	2.7	120	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	ZINC	100	3.6	100 U	R	j	UG/L
4Q2010	1010263	1010263-1	PC-067	ZIRCONIUM	100	2.5	100 U	R	j	UG/L

TABLE 12
OTHER STABLE CHEMISTRY QUALIFICATIONS
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Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
4Q2010	1010263	1010263-3	PC-028	ALUMINUM	500	76	410 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	ANTIMONY	100	15	100 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	ARSENIC	2	0.15	170	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	BARIIUM	500	0.93	27 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	BERYLLIUM	10	0.88	10 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	BORON	500	15	4500	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	CADMIUM	25	1.6	25 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	CALCIUM	2500	60	680000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	CHROMIUM	50	2.6	800	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	COBALT	50	2.2	50 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	COPPER	50	4.8	50 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	IRON	500	25	260 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	LEAD	15	6.4	15 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	LITHIUM	50	1.3	580	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	MAGNESIUM	5000	65	310000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	MANGANESE	50	0.57	29 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	MERCURY	0.2	0.0097	0.016 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	MOLYBDENUM	50	5.4	200	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	NICKEL	100	4.7	100 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	PHOSPHORUS	1000	29	1000 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	POTASSIUM	5000	540	35000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	SELENIUM	25	13	25 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	SILICON	250	22	40000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	SILVER	50	5.4	50 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	SODIUM	25000	160	2400000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	STRONTIUM	50	0.39	15000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	THALLIUM	0.2	0.016	0.05 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	TIN	250	14	250 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	TITANIUM	100	1.4	3.9 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	TOTAL SULFUR	5000	230	1000000	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	URANIUM	0.1	0.029	150	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	VANADIUM	50	2.7	46 B	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	ZINC	100	3.6	100 U	R	J	UG/L
4Q2010	1010263	1010263-3	PC-028	ZIRCONIUM	100	2.5	100 U	R	J	UG/L

TABLE 12
OTHER STABLE CHEMISTRY QUALIFICATIONS
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Event	SDG	Lab ID	Sample ID	Analyte	PQL	SQL	Result ¹	Qualifier	Comment	Unit
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Notes:

%D	Percent difference				+ / -				Result may be biased high/low, respectively	
UG/L	Microgram per liter				e				Comment code for spike recoveries	
PQL	Practical quantitation limit				p				Comment code for CAB issues	
QC	Quality control				J				Estimated value	
SDG	Sample delivery group				j				Comment code for other stable chemistry issues	
SQL	Sample quantitation limit									

Qualifiers/Comments:

1 Result field includes the numerical concentration and the laboratory qualifier or code.

TABLE 15
QUALIFICATION BASED ON EITHER UNACCEPTABLE CAB OR TDS BALANCE
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Client ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment
4Q2010	1010111	1010111-5	TIMETMW-3R	BICARBONATE ALKALINITY	20	20	110	J	p
4Q2010	1010111	1010111-5	TIMETMW-3R	CALCIUM	2500	60	140000	J-	j, p
4Q2010	1010111	1010111-5	TIMETMW-3R	CARBONATE ALKALINITY	20	20	20 U	UJ	p
4Q2010	1010111	1010111-5	TIMETMW-3R	CHLORIDE	10	3.2	250	J	p
4Q2010	1010111	1010111-5	TIMETMW-3R	FLUORIDE	0.2	0.018	0.67	J	p
4Q2010	1010111	1010111-5	TIMETMW-3R	MAGNESIUM	5000	65	86000	J-	j, p
4Q2010	1010111	1010111-5	TIMETMW-3R	NITRATE NITROGEN	0.4	0.031	2.9	J	p
4Q2010	1010111	1010111-5	TIMETMW-3R	PERCHLORATE	0.02	0.02	0.11	J	p
4Q2010	1010111	1010111-5	TIMETMW-3R	POTASSIUM	5000	540	9300	J	p
4Q2010	1010111	1010111-5	TIMETMW-3R	SODIUM	5000	33	280000	J-	j, p
4Q2010	1010111	1010111-5	TIMETMW-3R	SULFATE	50	3.9	1000	J	p
4Q2010	1010111	1010111-7	BRW-R1	BICARBONATE ALKALINITY	10	10	74	J	p
4Q2010	1010111	1010111-7	BRW-R1	CALCIUM	2500	60	360000	J-	j, p
4Q2010	1010111	1010111-7	BRW-R1	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010111	1010111-7	BRW-R1	CHLORIDE	10	3.2	310	J	p
4Q2010	1010111	1010111-7	BRW-R1	FLUORIDE	0.5	0.044	1.3	J	p
4Q2010	1010111	1010111-7	BRW-R1	MAGNESIUM	5000	65	170000	J-	j, p
4Q2010	1010111	1010111-7	BRW-R1	NITRATE NITROGEN	1	0.078	12	J	p
4Q2010	1010111	1010111-7	BRW-R1	PERCHLORATE	0.02	0.02	0.28	J	p
4Q2010	1010111	1010111-7	BRW-R1	POTASSIUM	5000	540	12000	J	p
4Q2010	1010111	1010111-7	BRW-R1	SODIUM	5000	33	410000	J-	j, p
4Q2010	1010111	1010111-7	BRW-R1	SULFATE	50	3.9	2200	J	p
4Q2010	1010126	1010126-1	DBMW-1	BICARBONATE ALKALINITY	10	10	69	J	p
4Q2010	1010126	1010126-1	DBMW-1	CALCIUM	2500	60	630000	J-	j, p
4Q2010	1010126	1010126-1	DBMW-1	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010126	1010126-1	DBMW-1	CHLORIDE	20	6.5	1100	J	p
4Q2010	1010126	1010126-1	DBMW-1	FLUORIDE	0.5	0.044	0.71	J	p
4Q2010	1010126	1010126-1	DBMW-1	MAGNESIUM	5000	65	270000	J-	j, p
4Q2010	1010126	1010126-1	DBMW-1	NITRATE NITROGEN	1	0.078	9.5	J	p
4Q2010	1010126	1010126-1	DBMW-1	PERCHLORATE	0.8	0.8	8.6	J	p
4Q2010	1010126	1010126-1	DBMW-1	POTASSIUM	5000	540	63000	J	p

TABLE 15
QUALIFICATION BASED ON EITHER UNACCEPTABLE CAB OR TDS BALANCE
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Client ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment
4Q2010	1010126	1010126-1	DBMW-1	SODIUM	5000	33	630000	J-	j, p
4Q2010	1010126	1010126-1	DBMW-1	SULFATE	100	7.8	2800	J	p
4Q2010	1010126	1010126-3	DBMW-3	BICARBONATE ALKALINITY	10	10	67	J	p
4Q2010	1010126	1010126-3	DBMW-3	CALCIUM	2500	60	570000	J-	j, p
4Q2010	1010126	1010126-3	DBMW-3	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010126	1010126-3	DBMW-3	CHLORIDE	20	6.5	1900	J	p
4Q2010	1010126	1010126-3	DBMW-3	FLUORIDE	0.5	0.044	0.52	J	p
4Q2010	1010126	1010126-3	DBMW-3	MAGNESIUM	5000	65	450000	J-	j, p
4Q2010	1010126	1010126-3	DBMW-3	NITRATE NITROGEN	1	0.078	15	J	p
4Q2010	1010126	1010126-3	DBMW-3	PERCHLORATE	0.8	0.8	10	J	p
4Q2010	1010126	1010126-3	DBMW-3	POTASSIUM	5000	540	160000	J	p
4Q2010	1010126	1010126-3	DBMW-3	SODIUM	50000	330	1200000	J-	j, p
4Q2010	1010126	1010126-3	DBMW-3	SULFATE	100	7.8	3800	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	BICARBONATE ALKALINITY	10	10	110	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	CALCIUM	2500	60	320000	J-	j, p
4Q2010	1010159	1010159-4	TIMETMW-4	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010159	1010159-4	TIMETMW-4	CHLORIDE	10	3.2	200	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	FLUORIDE	0.5	0.044	0.84	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	MAGNESIUM	5000	65	150000	J-	j, p
4Q2010	1010159	1010159-4	TIMETMW-4	NITRATE NITROGEN	1	0.078	3	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	PERCHLORATE	0.02	0.02	0.16	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	POTASSIUM	5000	540	9300	J	p
4Q2010	1010159	1010159-4	TIMETMW-4	SODIUM	5000	33	330000	J-	j, p
4Q2010	1010159	1010159-4	TIMETMW-4	SULFATE	50	3.9	1900	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	BICARBONATE ALKALINITY	10	10	130	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	CALCIUM	2500	60	220000	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010177	1010177-4	TIMETMW-6R	CHLORIDE	20	6.5	850	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	FLUORIDE	0.5	0.044	0.78	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	MAGNESIUM	5000	65	150000	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	NITRATE NITROGEN	1	0.078	5.4	J	p

TABLE 15
QUALIFICATION BASED ON EITHER UNACCEPTABLE CAB OR TDS BALANCE
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Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Client ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment
4Q2010	1010177	1010177-4	TIMETMW-6R	PERCHLORATE	0.2	0.2	1.4	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	POTASSIUM	5000	540	17000	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	SODIUM	5000	33	500000	J	p
4Q2010	1010177	1010177-4	TIMETMW-6R	SULFATE	100	7.8	1200	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	BICARBONATE ALKALINITY	20	20	200	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	CALCIUM	2500	60	400000	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	CARBONATE ALKALINITY	20	20	20 U	UJ	p
4Q2010	1010177	1010177-5	TIMETMW-5	CHLORIDE	20	6.5	700	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	FLUORIDE	0.5	0.044	2	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	MAGNESIUM	5000	65	150000	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	NITRATE NITROGEN	1	0.078	9.1	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	PERCHLORATE	0.04	0.04	0.55	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	POTASSIUM	5000	540	11000	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	SODIUM	5000	33	530000	J	p
4Q2010	1010177	1010177-5	TIMETMW-5	SULFATE	100	7.8	2000	J	p
4Q2010	1010201	1010201-1	CLD1-R	BICARBONATE ALKALINITY	20	20	250	J	p
4Q2010	1010201	1010201-1	CLD1-R	CALCIUM	2500	60	150000	J	p
4Q2010	1010201	1010201-1	CLD1-R	CARBONATE ALKALINITY	20	20	20 U	UJ	p
4Q2010	1010201	1010201-1	CLD1-R	CHLORIDE	20	6.5	1100	J	p
4Q2010	1010201	1010201-1	CLD1-R	FLUORIDE	0.5	0.044	3.6	J	p
4Q2010	1010201	1010201-1	CLD1-R	MAGNESIUM	5000	65	100000	J	p
4Q2010	1010201	1010201-1	CLD1-R	NITRATE NITROGEN	1	0.078	9	J	p
4Q2010	1010201	1010201-1	CLD1-R	PERCHLORATE	0.4	0.4	5.7	J	p
4Q2010	1010201	1010201-1	CLD1-R	POTASSIUM	5000	540	12000	J	p
4Q2010	1010201	1010201-1	CLD1-R	SODIUM	5000	33	910000	J	p
4Q2010	1010201	1010201-1	CLD1-R	SULFATE	100	7.8	1300	J	p
4Q2010	1010201	1010201-2	CLD4-R	BICARBONATE ALKALINITY	20	20	260	J	p
4Q2010	1010201	1010201-2	CLD4-R	CALCIUM	2500	60	44000	J	p
4Q2010	1010201	1010201-2	CLD4-R	CARBONATE ALKALINITY	20	20	20 U	UJ	p
4Q2010	1010201	1010201-2	CLD4-R	CHLORIDE	40	13	1800	J	p
4Q2010	1010201	1010201-2	CLD4-R	FLUORIDE	1	0.088	5.1	J	p

TABLE 15
QUALIFICATION BASED ON EITHER UNACCEPTABLE CAB OR TDS BALANCE
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Client ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment
4Q2010	1010201	1010201-2	CLD4-R	MAGNESIUM	5000	65	12000	J	p
4Q2010	1010201	1010201-2	CLD4-R	NITRATE NITROGEN	2	0.16	9.7	J	p
4Q2010	1010201	1010201-2	CLD4-R	PERCHLORATE	0.2	0.2	2.4	J	p
4Q2010	1010201	1010201-2	CLD4-R	SODIUM	25000	160	1800000	J	p
4Q2010	1010201	1010201-2	CLD4-R	SULFATE	200	16	2000	J	p
4Q2010	1010201	1010201-6	AA-09	TDS	200	200	5200	J	p
4Q2010	1010201	1010201-4	POU-3	BICARBONATE ALKALINITY	10	10	100	J	p
4Q2010	1010201	1010201-4	POU-3	CALCIUM	2500	60	790000	J	p
4Q2010	1010201	1010201-4	POU-3	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010201	1010201-4	POU-3	CHLORIDE	40	13	3500	J	p
4Q2010	1010201	1010201-4	POU-3	FLUORIDE	1	0.088	1 U	UJ	p
4Q2010	1010201	1010201-4	POU-3	MAGNESIUM	5000	65	400000	J	p
4Q2010	1010201	1010201-4	POU-3	NITRATE NITROGEN	2	0.16	14	J	p
4Q2010	1010201	1010201-4	POU-3	PERCHLORATE	2	2	37	J	p
4Q2010	1010201	1010201-4	POU-3	POTASSIUM	5000	540	49000	J	p
4Q2010	1010201	1010201-4	POU-3	SODIUM	25000	160	1500000	J	p
4Q2010	1010201	1010201-4	POU-3	SULFATE	200	16	2600	J	p
4Q2010	1010223	1010223-1	DBMW-5	BICARBONATE ALKALINITY	10	10	80	J	p
4Q2010	1010223	1010223-1	DBMW-5	CALCIUM	2500	60	660000	J	p
4Q2010	1010223	1010223-1	DBMW-5	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010223	1010223-1	DBMW-5	CHLORIDE	20	6.5	1100	J	p
4Q2010	1010223	1010223-1	DBMW-5	FLUORIDE	0.5	0.044	0.51	J	p
4Q2010	1010223	1010223-1	DBMW-5	MAGNESIUM	5000	65	230000	J	p
4Q2010	1010223	1010223-1	DBMW-5	NITRATE NITROGEN	1	0.078	27	J	p
4Q2010	1010223	1010223-1	DBMW-5	PERCHLORATE	0.4	0.4	4	J	p
4Q2010	1010223	1010223-1	DBMW-5	POTASSIUM	5000	540	77000	J	p
4Q2010	1010223	1010223-1	DBMW-5	SODIUM	5000	33	460000	J	p
4Q2010	1010223	1010223-1	DBMW-5	SULFATE	100	7.8	2300	J	p
4Q2010	1010223	1010223-5	J2D2-R2	BICARBONATE ALKALINITY	10	10	98	J	p
4Q2010	1010223	1010223-5	J2D2-R2	CALCIUM	2500	60	630000	J	p
4Q2010	1010223	1010223-5	J2D2-R2	CARBONATE ALKALINITY	10	10	10 U	UJ	p
4Q2010	1010223	1010223-5	J2D2-R2	CHLORIDE	20	6.5	1500	J	p

TABLE 15
QUALIFICATION BASED ON EITHER UNACCEPTABLE CAB OR TDS BALANCE
2010 2ND SEMESTER DATA VALIDATION SUMMARY REPORT
Titanium Metals Corporation, Henderson, Nevada

Event	SDG	Lab ID	Client ID	Analyte	PQL	SQL	Results ¹	Qualifier	Comment
4Q2010	1010223	1010223-5	J2D2-R2	FLUORIDE	0.5	0.044	1.1	J	p
4Q2010	1010223	1010223-5	J2D2-R2	MAGNESIUM	5000	65	280000	J	p
4Q2010	1010223	1010223-5	J2D2-R2	NITRATE NITROGEN	1	0.078	40	J	p
4Q2010	1010223	1010223-5	J2D2-R2	PERCHLORATE	0.04	0.04	0.67	J	p
4Q2010	1010223	1010223-5	J2D2-R2	POTASSIUM	5000	540	15000	J	p
4Q2010	1010223	1010223-5	J2D2-R2	SODIUM	5000	33	440000	J	p
4Q2010	1010223	1010223-5	J2D2-R2	SULFATE	100	7.8	1800	J	p

Notes:

Qualifiers/Comments

+/-	Result may be biased high/low, respectively	j	Comment code for other stable chemistry issues
UG/L	Microgram per liter	J	Estimated value
CAB	Cation-anion balance	p	Comment code for either TDS or CAB unacceptable
MG/L	Milligram per liter	U	Undetected
PQL	Practical quantitation limit	UJ	Undetected at an estimated quantitation limit
SDG	Sample delivery group		
TDS	Total dissolved solids		

1 Result field includes the numerical concentration and the laboratory qualifier or code.